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**IN THE UNITED STATES DISTRICT COURT FOR THE STATE OF UTAH,
CENTRAL DIVISION**

ARGON TECHNOLOGIES, INC. DBA
KLYMIT CORPORATION UTAH, a Utah
corporation,

Plaintiff,

vs.

SC CHILLAX STORE SRL. (DBA
WELLAX OUTDOORS), a foreign company,
and RADU ADUMITRESI, an individual

Defendants.

COMPLAINT

Case No. 1:19-cv-00006-PMW

Judge Paul M. Warner

Plaintiff Argon Technologies, Inc. DBA Klymit Corporation Utah (“**Klymit**” or “**Plaintiff**”), hereby files this Complaint against Defendant SC Chillax Store SRL, DBA WellaX Outdoors, and Radu Adumitresi (collectively “**WellaX**” or “**Defendants**”), complaining and alleging as follows:

PARTIES

1. Klymit is a Utah corporation with its principal place of business at 1265 West 1275 North, Suite 1, Centerville, Utah 84014.

2. Klymit is the owner of all right, title, and interest in U.S. Patent No. 9,756,955 for an Inflatable Pad and Methods for Using Same.

3. Klymit is the owner of all right, title, and interest in U.S. Patent No. 9,936,814 for an Inflatable Pad and Methods for Using Same.

4. On information and belief, SC Chillax Store SRL is a Romanian company with its principle place of business at Bulevardul Mamaia 85, Constanta, Romania. On information and belief, SC Chillax Store SRL also does business under the name WellaX Outdoors.

5. On information and belief, SC Chillax Store SRL is authorized to do business in the United States and in the State of Utah.

6. On information and belief, SC Chillax Store SRL directly or indirectly imports, develops, designs, manufactures, uses, distributes, markets, offers to sell and/or sells products and services in the United States, including in this district, and otherwise purposefully directs activities to the same.

7. On information and belief, Radu Adumitresi directly participates in and directs the activities of SC Chillax Store SRL specifically described below.

8. On information and belief, Radu Adumitresi is an individual who resides at Bulevardul Mamaia 85, Constanta, Romania.

JURISDICTION AND VENUE

9. This is an action for patent infringement arising under the patent laws of the United States of America, 35 U.S.C. §1, et. seq., including 35 U.S.C. § 271. This Court has subject matter jurisdiction under 28 U.S.C. § 1331 and §§ 1338(a).

10. On information and belief, this Court has personal jurisdiction over SC Chillax

Store SRL and Radu Adumitresi because they have substantial, systematic, and continuous contacts with this judicial district. On information and belief, SC Chillax Store SRL and Radu Adumitresi regularly conduct business in the State of Utah and in this judicial district. On information and belief, SC Chillax Store SRL and Radu Adumitresi have sold and offered to sell infringing products in this State and judicial district and have committed acts of patent infringement.

11. On information and belief, venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b)-(d) and 1400(b) and specifically 28 U.S.C. §§ 1391(c)(3). Certain of the acts giving rise to the claims alleged herein occurred in this judicial district. SC Chillax Store SRL and Radu Adumitresi have committed acts of infringement in this judicial district by, among other things, selling, and offering for sale infringing products in this judicial district.

GENERAL ALLEGATIONS

12. Klymit re-alleges and incorporates by reference each and every allegation made in the prior paragraphs as though they were fully set forth herein.

13. U.S. Patent No. 9,756,955 (the “955 Patent) and U.S. Patent No. 9,936,814 (the “814 Patent”) are directed to lightweight, inflatable sleeping pads.

14. Klymit is a leader and innovator in the field of lightweight, inflatable sleeping pads. One of Klymit’s award winning pads is the Static V.

15. On information and belief, SC Chillax Store SRL and Radu Adumitresi (collectively “WellaX Outdoors” or “Defendants”) make, use, sell, offer for sale and/or import infringing products in the United States, including the WellaX Ultralight Air Sleeping Pad. Defendants offer for sale and sell this pad through Amazon.com at

https://www.amazon.com/WellaX-Ultralight-Air-Sleeping-Pad/dp/B076PHYVD8/ref=sr_1_2_sspa?ie=UTF8&qid=1548790676&sr=8-2-spons&keywords=wellax+pad&psc=1

16. Defendants were provided with specific notice that the WellaX Ultralight Air Sleeping Pad infringes the '955 Patent and the '814 Patent from Klymit and from Klymit's attorneys.

**FIRST CLAIM FOR RELIEF
(Infringement of U.S. Patent No. 9,756,955)**

17. Klymit re-alleges and incorporates by reference each and every allegation made in the prior paragraphs as though they were fully set forth herein.

18. The '955 Patent, titled "Inflatable Pad and Methods for Using Same," was duly and legally issued on September 12, 2017. A true and correct copy of the '955 Patent is attached as Exhibit A.

19. The '955 Patent names Robert Nathan Alter, Cory S. Tholl, and Matthew Maxfield as co-inventors.

20. The '955 Patent has been in full force and effect since its issuance. Klymit owns by assignment the entire right, title, and interest in and to the '955 Patent, including the exclusive right to seek damages for past, current and future infringement thereof.



21. On information and belief, Defendants have been, and currently are, directly infringing the '955 Patent by making, using, selling, offering to sell, and/or importing into the United States sleeping pads including the WellaX Ultralight Air Sleeping Pad.



22. Specifically, the WellaX Ultralight Air Sleeping Pad infringes at least claims 1-7,



9, 10, 12-13, and 15-19 of the '955 Patent either literally or under the doctrine of equivalents.


23. Specifically, the WellaX Ultralight Air Sleeping Pad infringes claims 1-7, 9, 10, 12-13, and 15-19 of the '955 Patent as shown below. Some of the images in the following claim charts are taken from the Amazon listing for the WellaX Ultralight Air Sleeping Pad indicated above and some of the images are photographs taken of a WellaX Ultralight Air Sleeping Pad in Klymit's possession.



Claim Number	Claim Term	WELLAX Ultralight Air
1.	An inflatable sleeping pad configured for supporting a person sleeping thereon, the inflatable sleeping pad comprising:	 <p>The WELLAX Ultralight Air is such an inflatable sleeping pad.</p>


Claim Number	Claim Term	WELLAX Ultralight Air	
	a frame comprising a first sheet of material joined to a second sheet of material at a plurality of bond lines to form a plurality of fluidly connected air inflatable support members,		The WELLAX Ultralight Air is made of two sheets joined at bond lines. In between the bond lines are inflatable support members.
	each air inflatable support member defined between at least two bond lines of the plurality of bond lines,	 <p>REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p>	In between the bond lines are inflatable support members.


Claim Number	Claim Term	WELLAX Ultralight Air	
	wherein at least some of the air inflatable support members are configured to support a person lying on the inflatable sleeping pad;		The inflatable support members are configured to support a person lying on them.
	a first valve coupled to the frame and in fluid communication with the air inflatable support members for inflation thereof;	 <p data-bbox="743 1486 1377 1623">listing for this pad states: "Advanced inflation technology features 2 flat valves: 1 for inflation and 1 for deflation, making it quicker to inflate (only 4-6 breaths) or deflate."</p>	The WELLAX Ultralight Air includes a valve in fluid communication with the inflatable support members that allow the pad to be inflated. The Amazon



Claim Number	Claim Term	WELLAX Ultralight Air	
	wherein the frame includes a pattern of non-supporting regions defined by noninflating regions, the plurality of bond lines, and/or cutouts of the first and second sheets;		The frame includes a pattern of non-supporting regions at the non-supporting bond lines that connect the two sheets. The pattern includes many non-supporting portions arranged in a geometric pattern.
	wherein at least some of the bond lines comprise a rounded first end having a diameter, a flared second end having a width, and a transitioning portion therebetween,		 <p>The bond lines in the main portion of the pad are generally x-shaped with flared ends. Each of these, therefore has four ends that are rounded and flared. Between each end and the middle of the bond line is a transitioning portion that is narrower than the ends.</p>
	wherein the width of the flared second end is greater than the diameter of the rounded first end; and	The bond lines are not exactly symmetrical. In several instances, one end will flare greater than the other rounded end.	


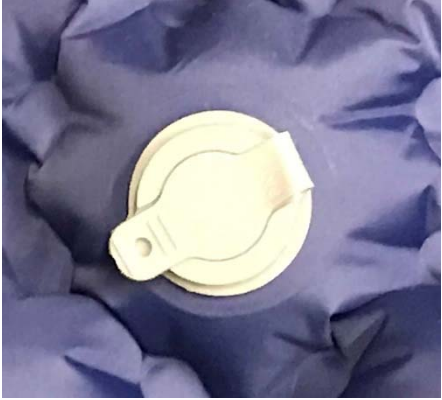
Claim Number	Claim Term	WELLAX Ultralight Air
	wherein the frame has a ratio of a fill volume/pad area in a range from about 0.4-4.0 ml/cm ² where the fill volume consists of the volume of air contained within the air inflatable support members at a pressure of 2 psi.	The fill volume is about 26,380 ml. The Amazon listing for this pad lists its length at 78 inches or about 198 cm long and 24 inches or about 61 cm wide. This is about 12,000 cm ² for each sheet for a total of about 24,000 cm ² of surface area. Deflated, the pad measures 93 inches or about 236 cm long and 28 inches or about 71 cm wide. This is about 16,500 cm ² for each sheet for a total of about 33,000 cm ² of surface area. Accordingly, the fill volume to pad area ratio is in the range from about 1.1 to about 0.80 ml/cm ² . This is in the range from about 0.4-4.0 ml/cm ² .
2.	The inflatable sleeping pad of claim 1,	See analysis of claim 1 above.
	wherein each non-supporting region has a length and width of at least 2 cm.	 <p>Each of the bond lines is over 2 cm long and over 2 cm wide.</p>
3.	The inflatable sleeping pad of claim 1,	See analysis of claim 1 above.



Claim Number	Claim Term	WELLAX Ultralight Air
	wherein at least a portion of the non-supporting regions are provided in the form of the bond lines between the first and second sheets,	 <p data-bbox="1036 373 1404 514">The WELLAX Ultralight Air includes several bond lines that join and weld the two sheets.</p>
	each bond line including the rounded first end, and the diameter of the rounded first end is at least 10 mm.	 <p data-bbox="1193 1161 1388 1333">Each rounded end has a diameter or width of over 10 mm.</p>
4.	The inflatable sleeping pad of claim 1,	See analysis of claim 1 above.



Claim Number	Claim Term	WELLAX Ultralight Air
	wherein the frame is elongate in a longitudinal direction and the pattern of non-supporting regions form a plurality of horizontal rows.	 <p>The WELLAX Ultralight Air is elongated vertically to support a sleeping person. The supporting portions arranged symmetrically such that horizontal rows can be seen.</p>
5.	The inflatable sleeping pad of claim 1,	See analysis of claim 1 above.
	wherein an average maximum vertical thickness of the support members is in a range from 2.5 cm to 8 cm.	At their thickest, the support members are about 6.35 cm. The Amazon listing for this pad lists the thickness at 2.5 inches, or 6.35 cm. This is between 2.5 cm and 8 cm.
6.	The inflatable sleeping pad of claim 5,	See analysis of claim 5 above.
	wherein the average maximum vertical thickness of the support members is at least 3 cm.	At their thickest, the support members are about 6.35 cm. The Amazon listing for this pad lists the thickness at 2.5 inches, or 6.35 cm.
7.	The inflatable sleeping pad of claim 1,	See analysis of claim 1 above.
	wherein one or both of the sheets of material are a polyurethane or a polyester.	The Amazon listing for this pad lists the states: "Laminated 20D Rip-stop Nylon and the TPU Layer provides a good balance between low

Claim Number	Claim Term	WELLAX Ultralight Air
		weight and durability.” TPU is thermoplastic polyurethane.
9.	The inflatable sleeping pad of claim 1,	See analysis of claim 1 above.
	wherein a weight of the frame is less than 750 g.	The Amazon listing for this pad states that this pad is 14.5 ounces or just over 411 grams.
10.	The inflatable sleeping pad of claim 1,	See analysis of claim 1 above.
	wherein the frame has a weight to surface area ratio less than 0.08 g/cm ² .	The Amazon listing for this pad lists its length at 78 inches or about 198 cm long and 24 inches or about 61 cm wide. This is about 12,000 cm ² for each sheet for a total of about 24,000 cm ² of surface area. The advertised weight of about 411 g divided by this surface area yields a weight to surface area ratio of under 0.02 g/cm ² . This is under 0.08 g/cm ² .
12.	An inflatable sleeping pad configured for supporting a person sleeping thereon, the inflatable pad comprising:	 <p>The WELLAX Ultralight Air is such an inflatable sleeping pad.</p>



Claim Number	Claim Term	WELLAX Ultralight Air	
	a frame comprising a first sheet of fabric material joined to a second sheet of fabric material to form a plurality of fluidly connected air inflatable support members,		<p>The WELLAX Ultralight Air is made of two sheets joined at bond lines. In between the bond lines are inflatable support members.</p>
	the frame having a maximum width of at least 40 cm and a maximum length of at least 150 cm,		<p>The Amazon listing for this pad lists its length at 78 inches or about 198 cm long and 24 inches or about 61 cm wide.</p>

Claim Number	Claim Term	WELLAX Ultralight Air	
	wherein a portion of the support members are configured to support a person lying thereon;	 <p data-bbox="760 772 1149 909">REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p>	The support members or flexing points are configured to support a person.
	a first valve coupled to the frame and in fluid communication with the air inflatable support members for inflation thereof;	 <p data-bbox="743 1371 1385 1518">The Amazon listing for this pad states: "Advanced inflation technology features 2 flat valves: 1 for inflation and 1 for deflation, making it quicker to inflate (only 4-6 breaths) or deflate."</p>	The WELLAX Ultralight Air includes a valve in fluid communication with the inflatable support members that allow the pad to be inflated.



Claim Number	Claim Term	WELLAX Ultralight Air
	wherein the frame includes a repeating pattern of non-supporting regions formed from fabric welds between the first and second sheets,	 <p>The frame includes a pattern of non-supporting regions at the non-supporting welds that connect the two sheets. The pattern includes many non-supporting portions arranged in a repeating, geometric pattern.</p>
	the repeating pattern including rounded welds with a diameter of at least 10 mm;	 <p>Each rounded end has a diameter or width of over 10 mm.</p>




Claim Number	Claim Term	WELLAX Ultralight Air
	wherein a portion of the fabric welds comprise at least one of the rounded welds at a first end and a flared weld at a second end having a width,	 <p>The welds in the main portion of the pad are generally x-shaped with flared ends. Each of these, therefore has four ends that are rounded and flared. Between each end and the middle of the weld is a</p> <p>transitioning portion that is narrower than the ends.</p>
	wherein the width of the flared weld is greater than the diameter of the at least one rounded weld,	The welds are not exactly symmetrical. In several instances, one end will flare greater than the other rounded end.
	wherein the flared and rounded welds reduce torsion when the inflatable pad is inflated;	 <p>When the WELLAX Ultralight Air is inflated, the ends of the welds near sides fold in on themselves in order to reduce torsion.</p>
	wherein an average maximum vertical thickness of the support members is in a range from 2.5 cm to 8 cm;	At their thickest, the support members are about 6.35 cm. The Amazon listing for this pad lists the thickness at 2.5 inches, or 6.35 cm. This is between 2.5 cm and 8 cm.
	wherein the frame has a weight to surface area ratio less than 0.08 g/cm ² ;	The Amazon listing for this pad lists its length at 78 inches or about 198 cm long and 24 inches or about 61 cm wide. This is about 12,000 cm ² for each sheet for a total of about 24,000 cm ² of surface area. The advertised weight of about 411 g divided by this surface area yields a weight to


Claim Number	Claim Term	WELLAX Ultralight Air
		surface area ratio of under 0.02 g/cm ² . This is under 0.08 g/cm ² .
	and wherein the frame has a ratio of a fill volume/pad area in a range from about 0.4-4.0 ml/cm ² where the fill volume is defined as the volume of air contained within the frame at a pressure of 2 psi.	The fill volume is about 26,380 ml. The Amazon listing for this pad lists its length at 78 inches or about 198 cm long and 24 inches or about 61 cm wide. This is about 12,000 cm ² for each sheet for a total of about 24,000 cm ² of surface area. Deflated, the pad measures 93 inches or about 236 cm long and 28 inches or about 71 cm wide. This is about 16,500 cm ² for each sheet for a total of about 33,000 cm ² of surface area. Accordingly, the fill volume to pad area ratio is in the range from about 1.1 to about 0.80 ml/cm ² . This is in the range from about 0.4-4.0 ml/cm ² .
13.	The inflatable sleeping pad of claim 12,	See analysis of claim 12 above.
	wherein one or both of the sheets of material are a polyurethane or a polyester.	The Amazon listing for this pad lists the states: "Laminated 20D Rip-stop Nylon and the TPU Layer provides a good balance between low weight and durability." TPU is thermoplastic polyurethane.
15.	The inflatable sleeping pad of claim 12	See analysis of claim 12 above.
	wherein a weight of the frame is less than 750 g.	The Amazon listing for this pad states that this pad is 14.5 ounces or just over 411 grams.

Claim Number	Claim Term	WELLAX Ultralight Air	
16.	An inflatable sleeping pad configured for supporting a person sleeping thereon, the inflatable pad comprising:		The WELLAX Ultralight Air is such an inflatable sleeping pad.
	a frame comprising a first sheet of fabric material joined to a second sheet of fabric material at a plurality of fabric welds to form a plurality of fluidly connected air inflatable support members,		The WELLAX Ultralight Air is made of two sheets joined at welds. In between the bond lines are inflatable support members.

Claim Number	Claim Term	WELLAX Ultralight Air	
	each air inflatable support member defined between at least two fabric welds of the plurality of fabric welds,	<div data-bbox="792 394 1156 760" data-label="Image"> </div> <div data-bbox="1209 367 1421 550" data-label="Text"> <p>In between the welds are inflatable support members.</p> </div> <div data-bbox="760 772 1149 907" data-label="Text"> <p>REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p> </div>	
	the frame having a maximum width of at least 40 cm and a maximum length of at least 150 cm	<div data-bbox="743 934 993 1690" data-label="Image"> </div> <div data-bbox="1019 928 1409 1117" data-label="Text"> <p>The Amazon listing for this pad lists its length at 78 inches or about 198 cm long and 24 inches or about 61 cm wide.</p> </div>	

Claim Number	Claim Term	WELLAX Ultralight Air	
	wherein at least some of the air inflatable support members are configured to support a person lying on the inflatable pad;		The inflatable support members are configured to support a person lying on them.
	a first valve coupled to the frame and in fluid communication with the air inflatable support members for inflation thereof;	 <p data-bbox="743 1486 1425 1633">The Amazon listing for this pad states: "Advanced inflation technology features 2 flat valves: 1 for inflation and 1 for deflation, making it quicker to inflate (only 4-6 breaths) or deflate."</p>	The WELLAX Ultralight Air includes a valve in fluid communication with the inflatable support members that allow the pad to be inflated.
	wherein an average maximum vertical thickness of the support members is in a range from 2.5 cm to 8 cm	At their thickest, the support members are about 6.35 cm. The Amazon listing for this pad lists the thickness at 2.5 inches, or 6.35 cm. This is between 2.5 cm and 8 cm.	

Claim Number	Claim Term	WELLAX Ultralight Air	
	and the frame includes fabric welds between the first and second sheets, wherein the fabric welds taper from a flared end having an individual width to a transitioning portion, the transitioning portion located between the flared end and a rounded end having a diameter,	 <p data-bbox="740 779 1419 848">The welds in the main portion of the pad are generally x-shaped with flared ends. Each of these, therefore has four ends that are rounded and flared. Between each end and the middle of the weld is a transitioning portion that is narrower than the ends.</p>	<p data-bbox="1122 369 1419 768">The welds in the main portion of the pad are generally x-shaped with flared ends. Each of these, therefore has four ends that are rounded and flared. Between each end and the middle of the weld is a</p>
	the flared end being at least 5 mm in length and the fabric welds increase in width at least 2 mm from the transitioning portion to the flared end, wherein the individual width of the flared end is greater than the diameter of the rounded end;	 <p data-bbox="740 1226 1419 1295">Each rounded end has a diameter or width of over 5 mm and they are over 2 mm thicker than the transitioning portions. The welds are not exactly symmetrical. In several instances, one end will flare greater than the other rounded end.</p>	<p data-bbox="1192 858 1419 1226">Each rounded end has a diameter or width of over 5 mm and they are over 2 mm thicker than the transitioning portions. The welds are not</p>
	wherein a portion of the fabric welds comprise a flare toward one end of the fabric weld wherein the flare reduces torsion when inflated.	 <p data-bbox="1138 1346 1419 1598">When the WELLAX Ultralight Air is inflated, the ends of the welds near sides fold in on themselves in order to reduce torsion.</p>	<p data-bbox="1138 1346 1419 1598">When the WELLAX Ultralight Air is inflated, the ends of the welds near sides fold in on themselves in order to reduce torsion.</p>
17.	The inflatable sleeping pad of claim 16,	See analysis of claim 16 above.	

Claim Number	Claim Term	WELLAX Ultralight Air
	wherein the fabric weld increases in width by at least 5 mm from the transitioning portion to the flared end.	 <p>Each rounded end has a diameter or width of about 5 mm greater than the width of the transitioning portion</p>
18.	The inflatable sleeping pad of claim 16,	See analysis of claim 16 above.
	wherein the frame has a ratio of a fill volume/pad area in a range from about 0.4-4.0 ml/cm ² where the fill volume consists of the volume of air contained within air inflatable support members at a pressure of 2 psi.	The fill volume is about 26,380 ml. The Amazon listing for this pad lists its length at 78 inches or about 198 cm long and 24 inches or about 61 cm wide. This is about 12,000 cm ² for each sheet for a total of about 24,000 cm ² of surface area. Deflated, the pad measures 93 inches or about 236 cm long and 28 inches or about 71 cm wide. This is about 16,500 cm ² for each sheet for a total of about 33,000 cm ² of surface area. Accordingly, the fill volume to pad area ratio is in the range from about 1.1 to about 0.80 ml/cm ² . This is in the range from about 0.4-4.0 ml/cm ² .
19.	The inflatable sleeping pad of claim 16,	See analysis of claim 16 above.
	wherein one or both of the sheets of material are a polyurethane or a polyester.	The Amazon listing for this pad lists the states: "Laminated 20D Rip-stop Nylon and the TPU Layer provides a good balance between low weight and durability." TPU is thermoplastic polyurethane.

24. On information and belief, Defendants have been, and currently are, inducing infringement of the '955 Patent, in violation of 35 U.S.C. § 271(b), by knowingly encouraging or aiding others to make, use, sell, or offer to sell sleeping pads including the WellaX Ultralight Air Sleeping Pad in the United States, or to import sleeping pads including the WellaX Ultralight Air

Sleeping Pad into the United States, without license or authority from Klymit, with knowledge of or willful blindness to the fact that their actions will induce others, including but not limited to its customers, partners, and/or end users, to directly infringe the '955 Patent. Defendants induce others to infringe the '955 Patent by encouraging and facilitating others to perform actions that Defendants know to be acts of infringement of the '955 Patent with intent that those performing the acts infringe the '955 Patent.

25. As a result of Defendants' infringement of the '955 Patent, Klymit has been damaged. Klymit is entitled to recover for damages sustained as a result of Defendants' wrongful acts in an amount to be determined.

26. In addition, Defendants' infringing acts have caused and are causing immediate and irreparable harm to Klymit.

27. Defendants have had actual knowledge of its infringement of the '955 Patent since no later than November 28, 2018. Defendants' attorney has had actual knowledge of Defendants' infringement of the '955 Patent since no later than December 11, 2018. On information and belief, Defendants' infringement of the '955 Patent has been and continues to be deliberate and willful, and, therefore, this is an exceptional case warranting an award of treble damages and attorney's fees to Klymit pursuant to 35 U.S.C. §§ 284-285.

**SECOND CLAIM FOR RELIEF
(Infringement of U.S. Patent No. 9,936,814)**

28. Klymit re-alleges and incorporates by reference each and every allegation made in the prior paragraphs as though they were fully set forth herein.

29. The '814 Patent, titled "Inflatable Pad and Methods for Using Same," was duly

and legally issued on April 10, 2018. A true and correct copy of the '814 Patent is attached as Exhibit B.



30. The '814 Patent names Robert Nathan Alter, Cory S. Tholl, and Matthew Maxfield as co-inventors.




31. The '814 Patent has been in full force and effect since its issuance. Klymit owns by assignment the entire right, title, and interest in and to the '814 Patent, including the exclusive right to seek damages for past, current and future infringement thereof.


32. On information and belief, Defendants have been, and currently are, directly infringing the '814 Patent by making, using, selling, offering to sell, and/or importing into the United States sleeping pads including the WellaX Ultralight Air Sleeping Pad.


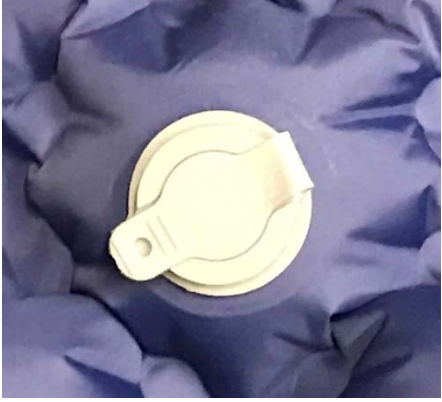
33. Specifically, the WellaX Ultralight Air Sleeping Pad infringes at least claims 1, 2, 7-9, 11, 14, 15, and 17-19 of the '814 Patent either literally or under the doctrine of equivalents.


34. Specifically, the WellaX Ultralight Air Sleeping Pad infringes claims 1, 2, 7-9, 11, 14, 15, and 17-19 of the '814 Patent as shown below. Some of the images in the following claim charts are taken from the Amazon listing for the WellaX Ultralight Air Sleeping Pad indicated above and some of the images are photographs taken of a WellaX Ultralight Air Sleeping Pad in Klymit's possession.


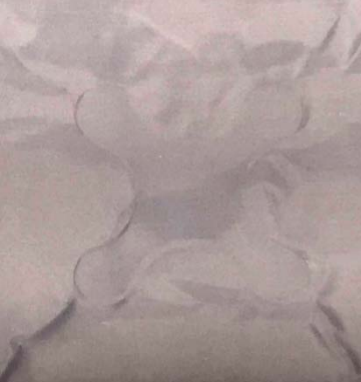
Claim Number	Claim Term	WELLAX Ultralight Air	
1.	An inflatable pad comprising:		The WELLAX Ultralight Air is an inflatable pad.
	a frame comprising: a first sheet of material and a second sheet of material joined at a plurality of bond lines,		The WELLAX Ultralight Air is made of two sheets joined at bond lines.



Claim Number	Claim Term	WELLAX Ultralight Air	
	wherein the bond lines are elongated, wherein at least one end of each of the bond lines increases in width;	 <p data-bbox="743 783 1092 846">of these bond lines increase in width to make a flared, rounded end.</p>	<p data-bbox="1109 373 1427 846">The bond lines in the main portion of the pad are generally x-shaped and elongated in two directions. Some other bond lines are portions of these x-shapes that are elongated in one direction. The ends</p>
	a plurality of fluidly coupled cells defined between at least two bond lines of the plurality of bond lines, wherein the plurality of fluidly coupled cells comprise a first width and a second width;	 <p data-bbox="760 1266 1149 1392">REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p>	<p data-bbox="1166 856 1427 1413">The WELLAX Ultralight Air includes many cells that are fluidly connected. Each one has a first width and a second width.</p>
	and a first valve coupled to the frame and in fluid communication with the plurality of fluidly coupled cells.		<p data-bbox="1190 1423 1427 1858">The WELLAX Ultralight Air includes a valve in fluid communication with the inflatable support members that allow the pad to be inflated. The Amazon</p>

Claim Number	Claim Term	WELLAX Ultralight Air
		listing for this pad states: "Advanced inflation technology features 2 flat valves: 1 for inflation and 1 for deflation, making it quicker to inflate (only 4-6 breaths) or deflate."
2.	The inflatable pad of claim 1,	See analysis of claim 1 above.
	wherein the first width and the second width are the same.	 <p>The first width and the second width of the cells are the same as they are generally symmetrical.</p>
7.	The inflatable pad of claim 1,	See analysis of claim 1 above.
	wherein an average vertical thickness of the plurality of fluidly coupled cells is in a range from 2.5 cm to 10 cm.	At their thickest, the support members are about 6.35 cm. The Amazon listing for this pad lists the thickness at 2.5 inches, or 6.35 cm. This is between 2.5 cm and 10 cm.



Claim Number	Claim Term	WELLAX Ultralight Air
8.	An inflatable pad comprising: a pad area;	 <p data-bbox="1019 373 1425 478">The WELLAX Ultralight Air is an inflatable pad with a pad area.</p>
	a first valve coupled to a frame and in fluid communication with the plurality of fluidly coupled cells;	 <p data-bbox="1198 1161 1425 1560">The WELLAX Ultralight Air includes a valve in fluid communication with the inflatable support members that allow the pad to be inflated.</p> <p data-bbox="743 1570 1425 1745">The Amazon listing for this pad states: “Advanced inflation technology features 2 flat valves: 1 for inflation and 1 for deflation, making it quicker to inflate (only 4-6 breaths) or deflate.”</p>


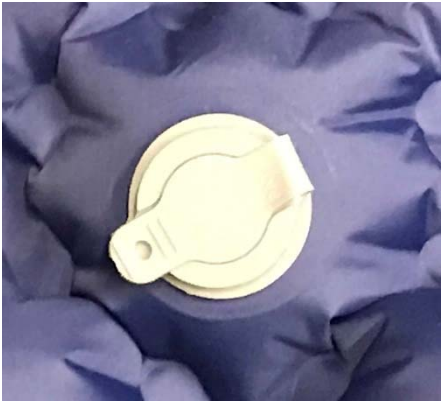
Claim Number	Claim Term	WELLAX Ultralight Air	
	the frame comprising a first sheet of fabric material and a second sheet of fabric material joined at a plurality of bond lines with at least one bond line around the entire periphery of the first sheet of fabric material and the second sheet of fabric material,		The WELLAX Ultralight Air is made of two sheets of TPU coated nylon joined at a plurality of bond lines. A single bond line joins the two sheets at the periphery of the pad, making it air tight and inflatable.
	wherein at least one end of each of the plurality of bond lines increases in width;		The bond lines in the main portion of the pad are generally x-shaped. The ends of these bond lines increase in width to make a flared, rounded end.



Claim Number	Claim Term	WELLAX Ultralight Air
	wherein the plurality of bond lines comprise non-supporting regions wherein the non-supporting regions cover at least 25 cm ² of the pad area.	 <p data-bbox="1019 373 1419 594">The plurality of bond lines cover a significant portion of the WELLAX Ultralight Air. Cumulatively, they cover well over 25 cm² of the pad area.</p>
9.	The inflatable pad of claim 8,	See analysis of claim 8 above.
	wherein a portion of the plurality of bond lines are non-perpendicular to the periphery of the frame.	 <p data-bbox="1122 1234 1419 1560">The bond lines in the main portion of the pad are generally x-shaped. The axes of the x-shape are more or less 45 degrees off of the periphery of the frame and not perpendicular to it.</p>
11.	The inflatable pad of claim 8,	See analysis of claim 8 above.



Claim Number	Claim Term	WELLAX Ultralight Air
	wherein the plurality of fluidly coupled cells comprise a first width and a second width	<div data-bbox="792 394 1157 762">  </div> <div data-bbox="1206 373 1425 741"> <p>The WELLAX Ultralight Air includes many cells that are fluidly connected. Each one has a first width and a second width.</p> </div> <div data-bbox="760 772 1149 909"> <p>REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p> </div>
	wherein the first width is the same as the second width.	<div data-bbox="743 940 995 1696">  </div> <div data-bbox="1019 930 1425 1077"> <p>The first width and the second width of the cells are the same as they are generally symmetrical.</p> </div>
14.	The inflatable pad of claim 8,	See analysis of claim 8 above.
	wherein an average vertical thickness of the	At their thickest, the support members are about 6.35 cm. The Amazon listing for this pad lists the

Claim Number	Claim Term	WELLAX Ultralight Air	
	plurality of fluidly coupled cells is in a range from 2.5 cm to 10 cm.	thickness at 2.5 inches, or 6.35 cm. This is between 2.5 cm and 10 cm.	
15.	An inflatable sleeping pad comprising:	<div data-bbox="751 510 1174 1140" data-label="Image"> </div> <div data-bbox="1190 489 1409 636" data-label="Text"> <p>The WELLAX Ultralight Air is an inflatable sleeping pad.</p> </div>	
	a frame configured to hold air and configured to support a person sleeping thereon,	<div data-bbox="792 1224 1157 1581" data-label="Image"> </div> <div data-bbox="1206 1192 1409 1413" data-label="Text"> <p>The WELLAX Ultralight Air is configured to support a person sleeping on it.</p> </div> <div data-bbox="751 1602 1149 1728" data-label="Text"> <p>REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p> </div>	

Claim Number	Claim Term	WELLAX Ultralight Air	
	the frame comprising: a first sheet of material and a second sheet of material joined at their periphery by an outer bond line;		<p>The WELLAX Ultralight Air is made of two sheets of TPU coated nylon joined at a plurality of bond lines. A single bond line joins the two sheets at the periphery of the pad, making it air tight and inflatable.</p>
	a plurality of bond lines within the periphery of the outer bond line wherein at least one end of each of the plurality of bond lines within the periphery increases in width;		<p>The bond lines in the main portion of the pad are generally x-shaped. The ends of these bond lines increase in width to make a flared, rounded end.</p>

Claim Number	Claim Term	WELLAX Ultralight Air	
	a plurality of fluidly coupled cells defined between at least two bond lines of the plurality of bond lines;	 <p data-bbox="760 772 1149 909">REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p>	The WELLAX Ultralight Air includes many cells that are fluidly connected.
	and a first valve coupled to the frame and in fluid communication with the plurality of fluidly coupled cells.	 <p data-bbox="743 1371 1385 1518">The Amazon listing for this pad states: "Advanced inflation technology features 2 flat valves: 1 for inflation and 1 for deflation, making it quicker to inflate (only 4-6 breaths) or deflate."</p>	The WELLAX Ultralight Air includes a valve in fluid communication with the inflatable support members that allow the pad to be inflated.
17.	The inflatable sleeping pad of claim 15,	See analysis of claim 15 above.	

Claim Number	Claim Term	WELLAX Ultralight Air	
	wherein a portion of the plurality of bond lines are separate from and not in communication with the outer bond line.		The bond lines in the main portion of the pad are not connected to the outer bond line.
18.	The inflatable pad of claim 15,	See analysis of claim 15 above.	
	wherein the plurality of bond lines are elongated and flare toward a second end of the plurality of bond lines.		The bond lines in the main portion of the pad are generally x-shaped and elongated in two directions. Some other bond lines are portions of these x-shapes that are elongated in one direction. The ends of these bond lines increase in width to make a flared, rounded end.
19.	The inflatable pad of claim 15,	See analysis of claim 15 above.	

Claim Number	Claim Term	WELLAX Ultralight Air
	wherein the plurality of fluidly coupled cells comprise a first width and a second width	<div data-bbox="789 394 1157 758">  </div> <div data-bbox="1208 373 1414 737"> <p>The WELLAX Ultralight Air includes many cells that are fluidly connected. Each one has a first width and a second width.</p> </div> <div data-bbox="756 772 1149 905"> <p>REVOLUTIONARY DESIGN Your weight is supported by dozens of flexing points for increased comfort</p> </div>
	wherein the first width is the same as the second width.	<div data-bbox="740 940 995 1696">  </div> <div data-bbox="1019 932 1409 1077"> <p>The first width and the second width of the cells are the same as they are generally symmetrical.</p> </div>

35. On information and belief, Defendants have been, and currently are, inducing

infringement of the '814 Patent, in violation of 35 U.S.C. § 271(b), by knowingly encouraging or aiding others to make, use, sell, or offer to sell sleeping pads including the WellaX Ultralight Air Sleeping Pad in the United States, or to import sleeping pads including the WellaX Ultralight Air Sleeping Pad into the United States, without license or authority from Klymit, with knowledge of or willful blindness to the fact that their actions will induce others, including but not limited to its customers, partners, and/or end users, to directly infringe the '814 Patent. Defendants induce others to infringe the '814 Patent by encouraging and facilitating others to perform actions that Defendants know to be acts of infringement of the '814 Patent with intent that those performing the acts infringe the '814 Patent.

36. As a result of Defendants' infringement of the '814 Patent, Klymit has been damaged. Klymit is entitled to recover for damages sustained as a result of Defendants' wrongful acts in an amount to be determined.

37. In addition, Defendants' infringing acts have caused and are causing immediate and irreparable harm to Klymit.

38. Defendants have had actual knowledge of its infringement of the '814 Patent since no later than December 11, 2018. Defendants' attorney has had actual knowledge of Defendants' infringement of the '814 Patent since no later than December 11, 2018. On information and belief, Defendants' infringement of the '814 Patent has been and continues to be deliberate and willful, and, therefore, this is an exceptional case warranting an award of treble damages and attorney's fees to Klymit pursuant to 35 U.S.C. §§ 284-285.

PRAYER FOR RELIEF

WHEREFORE, Klymit prays for judgment against Defendants as follows:

A. That Defendants have infringed, and continue to infringe, the '955 Patent and the '814 Patent;

B. That Defendants pay Klymit damages adequate to compensate Klymit for Defendants' infringement of the '955 Patent and the '814 Patent, together with interest and costs under 35 U.S.C. 13 § 284;

C. That Defendants be ordered to pay pre-judgment and post-judgment interest on the damages assessed;

D. That Defendants be ordered to pay supplemental damages to Klymit, including interest, with an accounting, as needed;

E. That Defendants' infringement is willful and that the damages awarded to Klymit should be trebled;

F. That this is an exceptional case under 35 U.S.C. § 285 and that Defendants be ordered to pay Klymit's attorney's fees and costs in this action; and

G. That Klymit be awarded such other and further relief, including equitable relief, as this Court deems just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38(b), Klymit hereby demands a trial by jury on all issues triable by jury.

DATED this 31st day of January, 2019.

DURHAM JONES & PINEGAR, P.C.

/s/ Clinton E. Duke
Clinton E. Duke
*Attorney for Plaintiff Argon Technologies,
Inc.*

EXHIBIT A

(12) **United States Patent**
Alder et al.

(10) **Patent No.:** **US 9,756,955 B2**
(45) **Date of Patent:** **Sep. 12, 2017**

(54) **INFLATABLE PAD AND METHODS FOR USING SAME**

(56) **References Cited**

(71) Applicant: **Argon Technologies, Inc.**, Ogden, UT (US)

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(72) Inventors: **Robert Nathan Alder**, North Ogden, UT (US); **Cory S. Tholl**, Kaysville, UT (US); **Matthew Maxfield**, North Salt Lake, UT (US)

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(73) Assignee: **Argon Technologies, Inc.**, Ogden, UT (US)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) Filed: **Sep. 21, 2015**

(65) **Prior Publication Data**

US 2016/0007763 A1 Jan. 14, 2016

(Continued)

Related U.S. Application Data

Primary Examiner — Eric Kurilla

(63) Continuation of application No. 12/942,897, filed on Nov. 9, 2010, now abandoned.

(74) *Attorney, Agent, or Firm* — Durham Jones & Pinegar, P.C. Intellectual Property Law Group

(60) Provisional application No. 61/259,568, filed on Nov. 9, 2009, provisional application No. 61/370,405, filed on Aug. 3, 2010.

(57) **ABSTRACT**

(51) **Int. Cl.**
A47C 27/08 (2006.01)

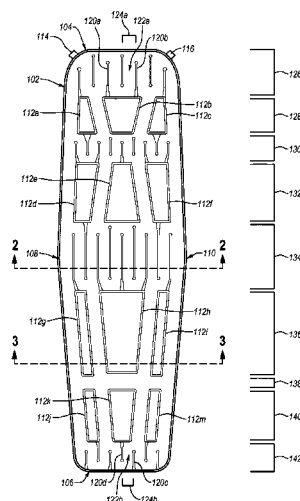
The inflatable pad includes an inflatable frame having a length and width that defines a pad area suitable for supporting a person lying thereon. A plurality of internal support members are configured to support the weight of a person lying thereon and elevate the person above the ground. The inflatable pad includes non-supporting regions that require less fill volume than regions that support primary support regions such as the hips and shoulder.

(52) **U.S. Cl.**
CPC **A47C 27/081** (2013.01); **A47C 27/087** (2013.01)

(58) **Field of Classification Search**
CPC A47C 27/081; A47C 27/10; A47C 27/18; A47C 27/08; A47C 27/128; A61G 7/05769; A61G 7/05776

See application file for complete search history.

19 Claims, 6 Drawing Sheets



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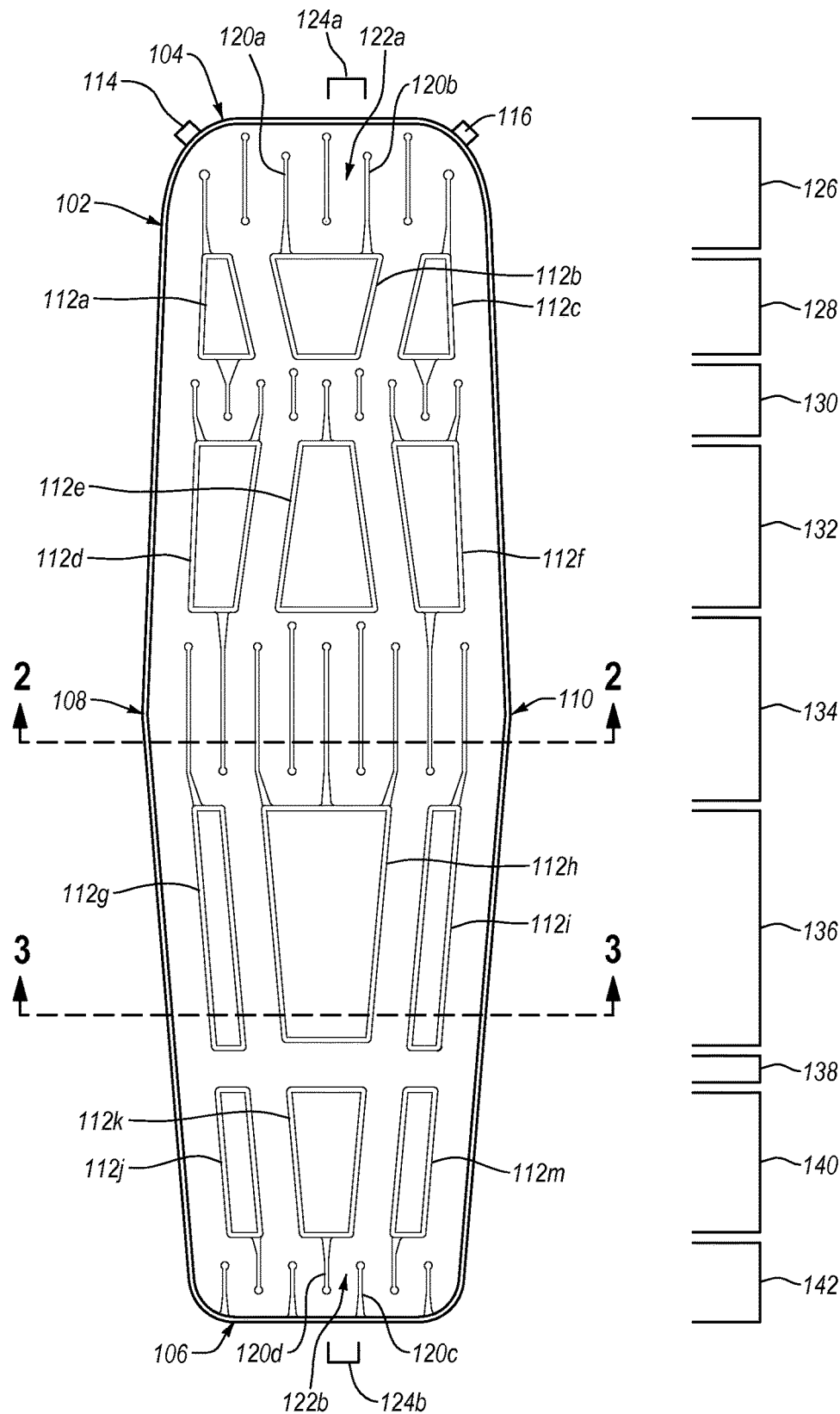


Fig. 1

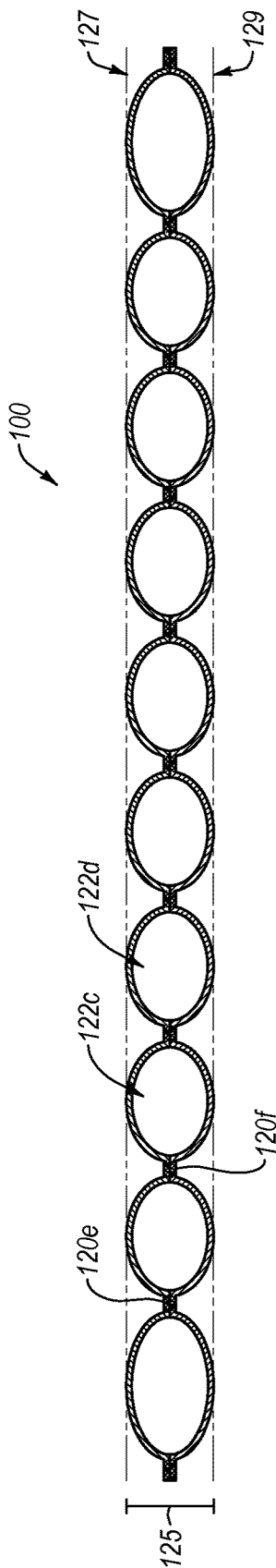


Fig. 2

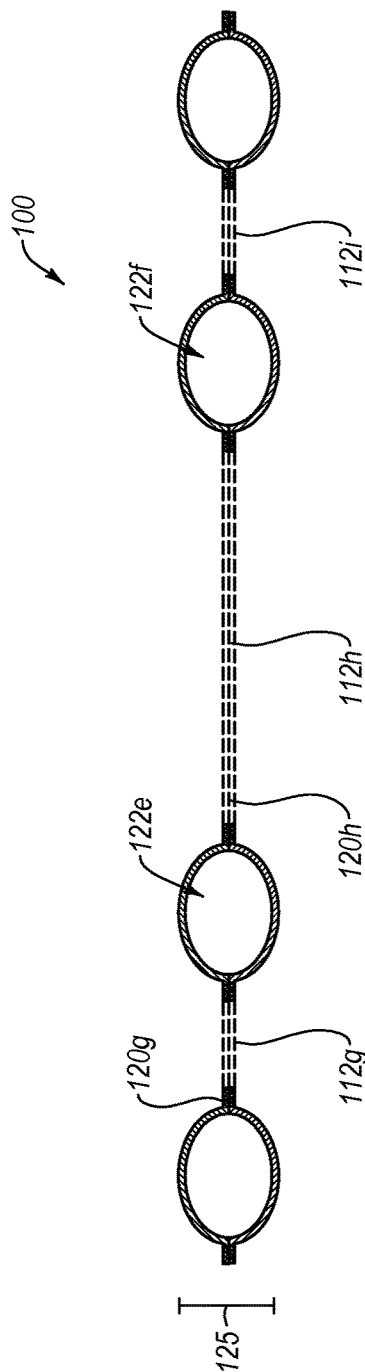


Fig. 3

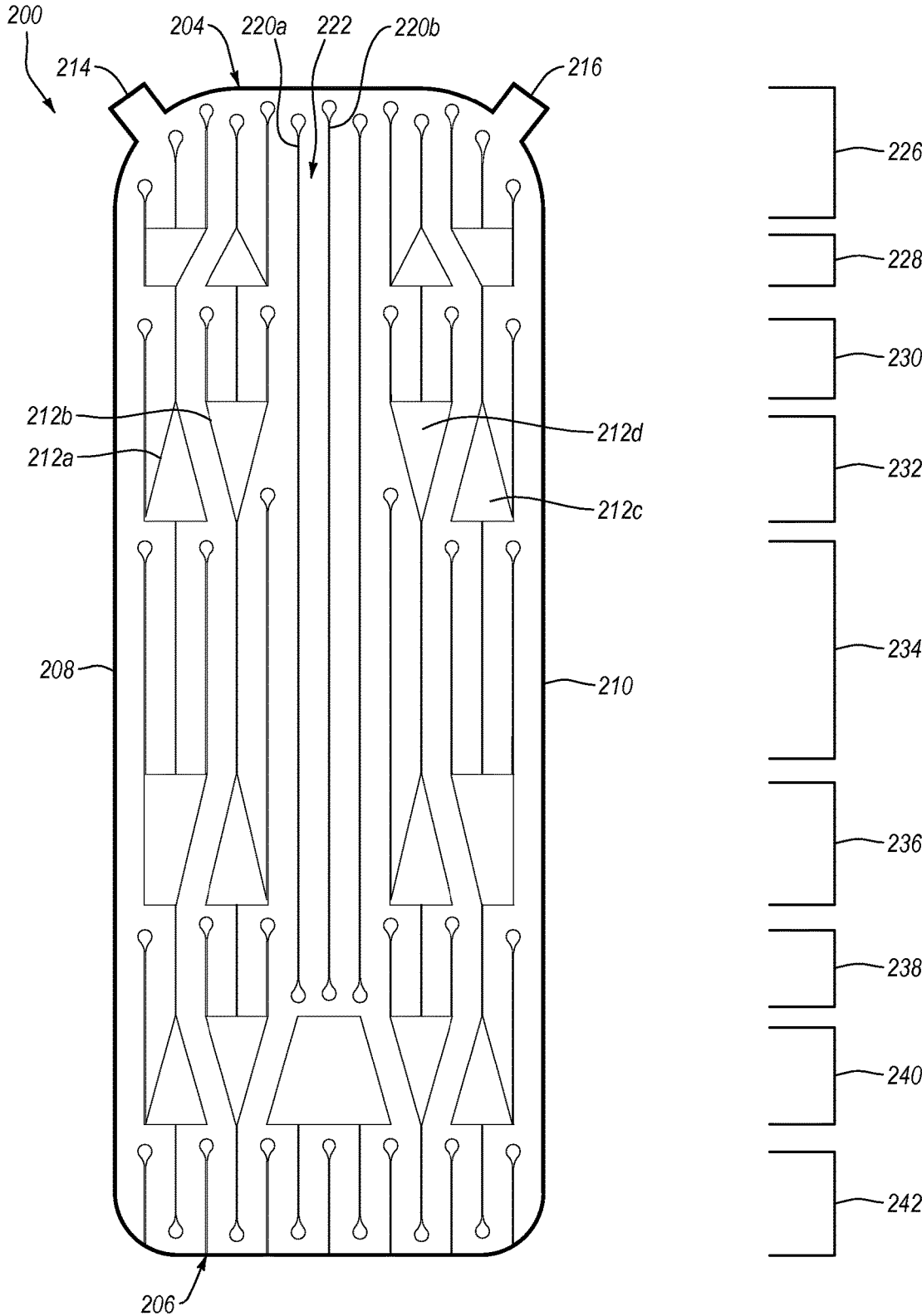


Fig. 4

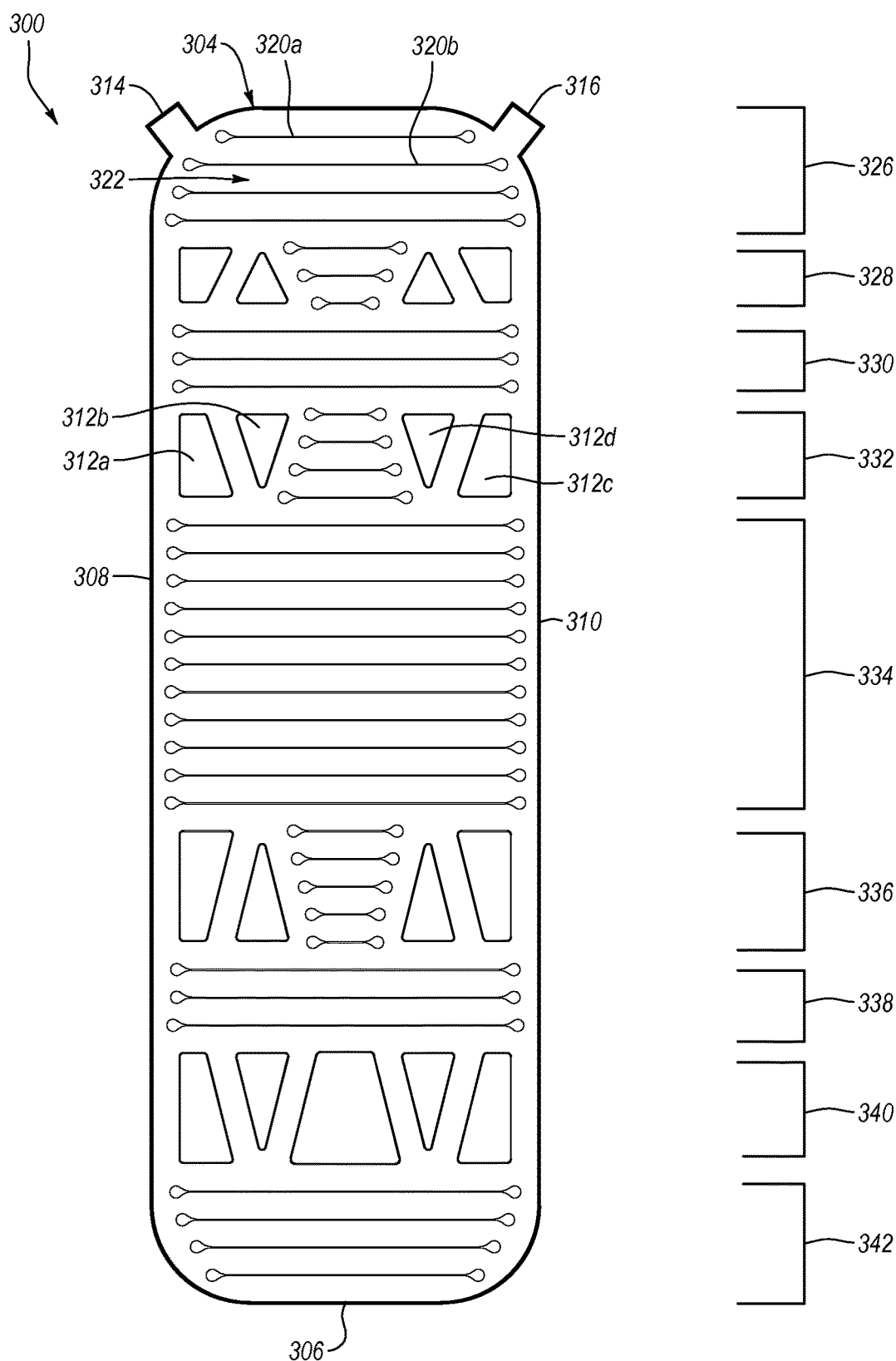


Fig. 5

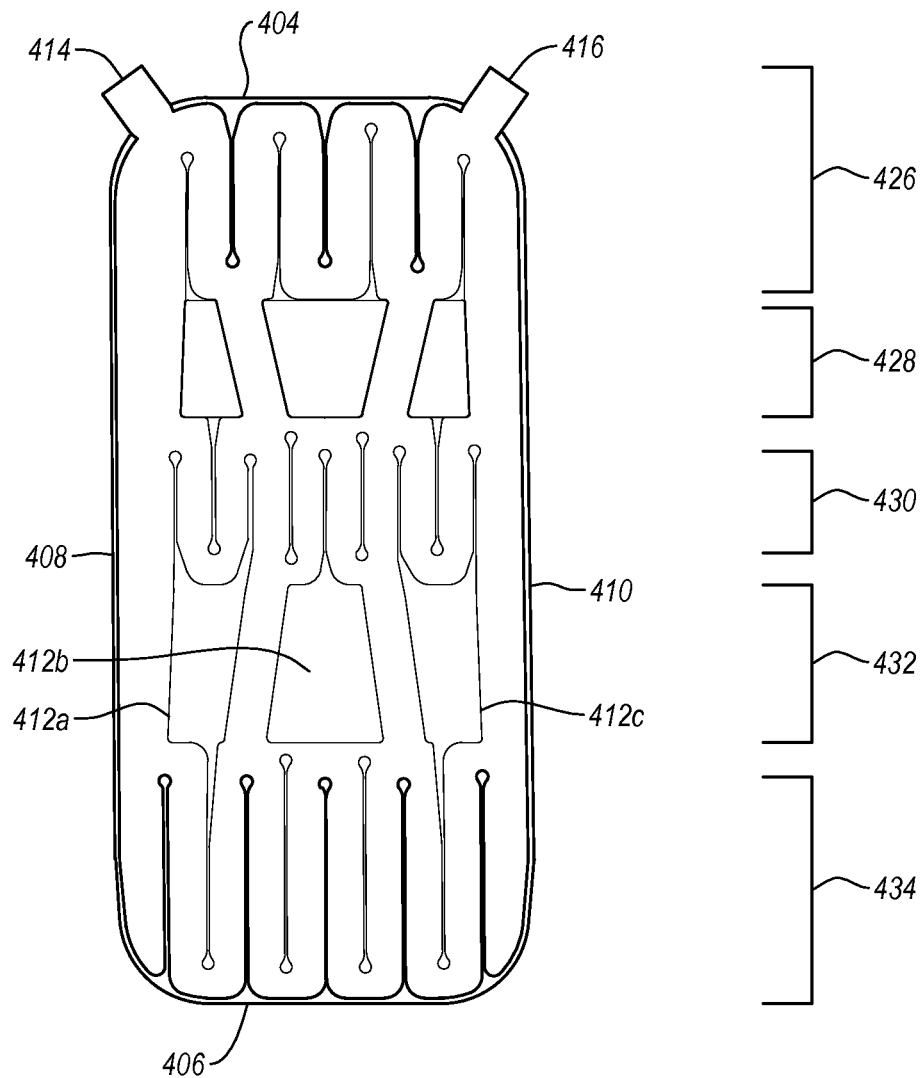


Fig. 6

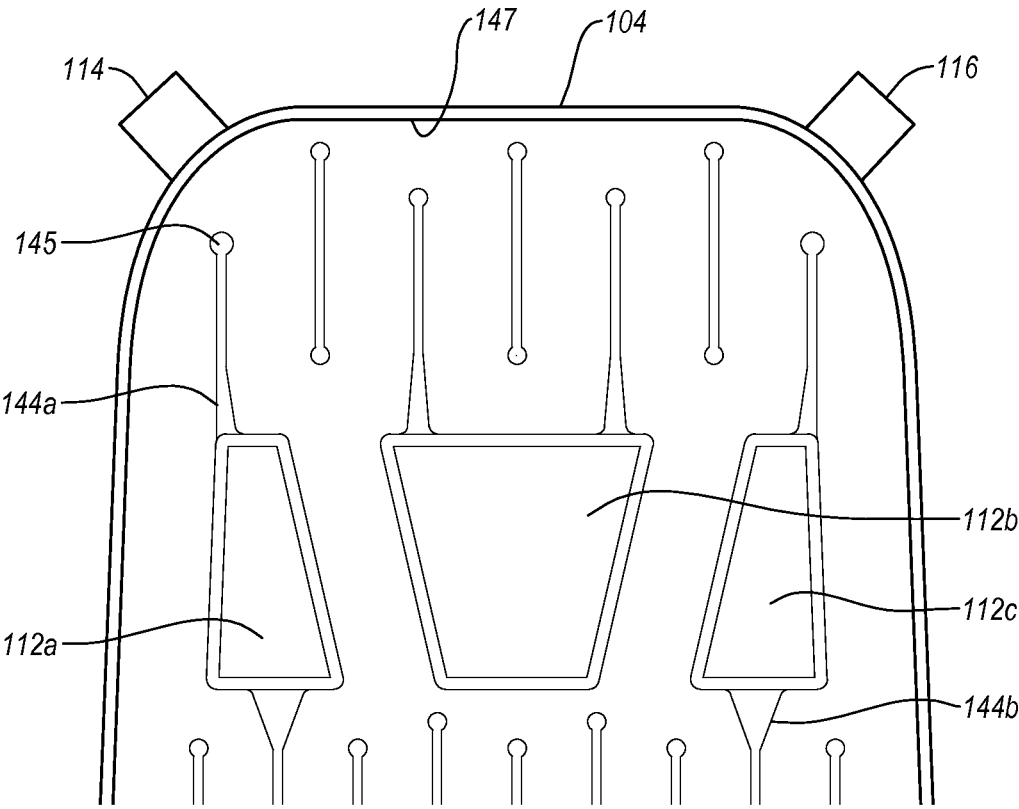


Fig. 7

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**INFLATABLE PAD AND METHODS FOR
USING SAME****CROSS-REFERENCE TO RELATED
APPLICATIONS**

The present application is a continuation of U.S. patent application Ser. No. 12/942,897, filed Nov. 9, 2010, entitled INFLATABLE PAD AND METHODS FOR USING SAME, which claims the benefit of U.S. Provisional Patent Application Ser. No. 61/259,568 filed Nov. 9, 2009, entitled "INFLATABLE FRAME STRUCTURE," and U.S. Provisional Patent Application Ser. No. 61/370,405 filed Aug. 3, 2010 entitled "INFLATABLE FRAME STRUCTURE," which are both hereby incorporated herein by reference in their entirety.

BACKGROUND OF THE INVENTION**1. The Field of the Invention**

The present invention relates to inflatable support structures.

2. The Relevant Technology

When camping, a lightweight pad or mattress is typically used under a sleeping bag. Camping pads provide support, padding, and some insulation for the user. Camping pads fall into two general categories: inflatable and not inflatable.

Those that are not inflatable are essentially closed-cell foam strips of a predetermined size. Non-supporting pads tend to be heavier than inflatable types. Non-supporting pads may be used in any camping situation.

There are two basic types of inflatable camping pads, both of which rely on a quantity of air for inflation during use and which deflate for portage.

A first, and generally older type of camping pad, is essentially an inflatable air mattress. A fill valve is opened and air is forced in under positive pressure by mouth, typically, to inflate the camping pad a desired amount.

A second, and generally newer type of camping pad, is a variation of the prior type that also includes an open-cell expandable type of foam filler therein. When a fill valve for such a type of camping pad is opened, the compressed foam (from the deflated state) begins to expand and naturally inflates the mattress. The camping pads that include the foam are generally regarded as being of superior design because they self-inflate (at least to a limited extent) and therefore are easier to use. Also, they tend to be warmer and therefore, more comfortable.

While these and perhaps other types of camping pads or mattresses have been used for a long time, they have certain disadvantages when used for camping. For example, virtually all campers are aware of the rarity of level, smooth ground. In addition, the ground tends to act as a heat sink that can rob the sleeper of valuable body heat, which can cause campers to be cold while sleeping on the ground.

BRIEF SUMMARY OF THE INVENTION

The present invention relates to inflatable pads and methods for using the inflatable pads to support a person lying thereon (e.g., lying supine, prone, or on one's side on the ground while camping). The inflatable pad includes an inflatable frame having a length and width that defines a pad area suitable for supporting a person lying thereon. A plurality of internal support members are configured to support the weight of a person lying thereon and elevate the person above the ground. The inflatable pad includes non-

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supporting regions that have less fill volume than regions that support primary support regions such as the hips and shoulder. Fill volume (i.e., the air required to fill the inflatable support members) is reduced by properly selecting the thickness and/or spacing of the support members in selected regions of the pad. The reduced fill volume allows the pad to be filled in a more reasonable period of time and with less effort than inflatable pads that have uniform support. Moreover, in some embodiment, the inflatable pad may be inflated to pressures greater than 2 psi (i.e., greater than pressures obtained using one's lungs), which provides greater comfort and allows proper support with a much thinner and lighter pad compared to inflatable pads that have uniform cushioning across the length of the pad.

In one embodiment the inflatable pad includes a frame comprising a first sheet of material joined to a second sheet of material by a plurality of elongate bond lines, the elongate bond lines forming a plurality of fluidly coupled cells that define a plurality of air-inflatable support members, a portion of the bond lines define non-supporting regions within the pad area. A first valve is coupled to the inflatable frame and is in fluid communication with the fluidly coupled cells.

In a second embodiment, the inflatable pad includes primary support regions that have more volume per unit of pad area as compared to secondary support members. In this embodiment, the inflatable pad includes an inflatable frame having a length and width that defines a pad area suitable for supporting a person lying thereon, the frame including a plurality of fluidly coupled cells that define a plurality of air inflatable support members. The frame has a plurality of primary supported regions and a plurality of secondary supported regions. The primary supported regions have a higher pad volume per unit of pad area than the secondary supported regions. The primary support regions are located in a hip region, shoulder region, and/or head region and the secondary supported regions are located in a neck, middle back, upper leg, and/or lower leg region. The inflatable pad also includes a first valve coupled to the inflatable frame and in fluid communication with the fluidly coupled cells.

The present invention also relates to inflatable pad that have minimal torsion when inflated. The inflatable pads include bond lines that form the plurality fluidly coupled cells. The bond lines may include fabric welds in which a first portion of the bond lines have a different bond thickness than a second portion of the bond lines. The different thicknesses of the bond lines are positioned on the inflatable pad so as to reduce torsion in the frame when inflated.

The present invention is also directed to methods for inflating and supporting a person on the inflatable pad. In one embodiment, the methods can include inflating the pad to a first pressure by mouth and then inflating to a second higher pressure using a pump. This embodiment takes advantage of the large volumes, low pressure capabilities of a person's lungs, while providing a reasonably sized pump that can create the pressures that provide comfort and proper insulation in a compact inflatable pad.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

To further clarify the above and other advantages and features of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended

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drawings. It is appreciated that these drawings depict only illustrated embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

FIG. 1 illustrate an inflatable pad according to one embodiment of the invention;

FIG. 2 is a cross section of the inflatable pad of FIG. 1 showing a primary region with high pad volume per unit pad area;

FIG. 3 is a cross section of a the inflatable pad of FIG. 2 showing a secondary region with a low pad volume per unit pad area;

FIG. 4 illustrates an alternative embodiment of an inflatable pad according to the present invention including substantially parallel vertical bond lines;

FIG. 5 illustrates an alternative embodiment of an inflatable pad according to the present invention including substantially parallel horizontal bond lines;

FIG. 6 illustrates yet another alternative embodiment of an inflatable pad according to the present invention; and

FIG. 7 is a partial top view of the inflatable pad of FIG. 1.

DETAILED DESCRIPTION

I. Introduction

The present invention relates to inflatable pads such as, but not limited to, sleeping pads used for camping. The placement of the support structures is designed in such a way as to minimize weight, and volume, but achieve proper support. In addition, because the inflatable pad uses air pressure to support the camper's weight, the inflatable frame structure can be made from non-rigid materials, which allows the frame to be collapsed and packed into a small volume when the frame is not inflated.

The inflatable frame structure described herein may be used to lift a person and/or camping pad or another article off of the ground. By lifting a camper's sleeping bag, camping pad, tent, or other article off the cold ground, the air trapped between the ground and the pad, tent, or person provides substantial insulation relative to the bulk and weight of the sleeping pad. Additionally, because the sleeping pad elevates the camping pad above the ground, the frame structure may provide additional protection from rocks, roots, and other objects that might otherwise cause discomfort to the sleeper.

For purposes of this invention, the term fill volume means the volume of air within the fluidly coupled support members when filled to a pressure of 2 psi.

For purposes of this invention, the term pad area means the footprint of the pad when inflated to a usable pressure (i.e., the pressure in the pad is sufficient to elevate a person off the ground). The pad area includes non-supported or non-inflated regions within the periphery of the inflated pad.

II. Sleeping Pads

FIG. 1 illustrates an example inflatable sleeping pad 100 configured for supporting a person sleeping thereon. The sleeping pad includes an inflatable frame 102 having a length and width that defines a pad area suitable for supporting a person lying thereon. The frame has a length that extends between first end 104 (i.e., head end) and second end 106 (feet end) and a width that extends between side 108 and side 110. Sleeping pad 100 also includes a first valve 114

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that is mouth inflatable and a second valve 116 that connects to a pump. Valves 114 and 116 are in fluid communication with frame 102 and are configured to allow frame 102 to be inflated and deflated.

Sleeping pad 100 is formed from a first sheet of material joined to a second sheet of material by a plurality of elongate bond lines 120. For clarity, only a portion of the bond lines and fluidly coupled cells illustrated in FIGS. 1-6 are identified with numbers. In FIG. 1, bond lines 120a and 120b join first and second sheets of fabric together to form a fluid cell 122a that when inflated provides a support member having a width 124a. Similarly, bond lines 120d and 120c form fluid cell 122b that, when inflated, provide a support member having a width 124b.

In the embodiment shown in FIG. 1, a portion of the bond lines form a plurality of fluidly coupled cells that provide inflatable support members and at least a portion of the bond lines form non-supporting regions within the pad area. For example, cut outs 112a, 112b, 112c, 112d, 112e, 112f, 112g, 112h, 112i, 112j, 112k, and 112m may be non-inflatable regions that are sealed off by bond lines from valves 114 and 116 and cells 124a and 124b. In FIG. 1, the non-supporting regions 112 may have the fabric cut out to minimize weight. However, in alternative embodiments non-inflated regions 112 may include one or more layers of fabric. Moreover, non-supporting regions may be inflatable so long as the vertical thickness of the regions renders the region, non-supporting. Non-supporting regions typically have a vertical thickness less than half that of the supporting members, preferably less than one third, and most preferably less than one fourth that of the vertical thickness of the adjacent supporting members.

In one embodiment, the sheets of material joined to form the fluidly coupled cells may be a gas impermeable laminate material, such as, but not limited to, polyethylene, polypropylene, polyurethane, urethane, silicone rubber, latex rubber, polytetrafluoroethylene (PTFE), expanded PTFE, butyl rubber, and/or Mylar.

Exemplary techniques for forming bond lines with material that is joined together to form a plurality of fluidly coupled cells include, but are not limited to, ultrasonic welding, laser welding, stamp heat welding, hot plate welding, gluing, taping, sewing, one piece woven, and other fabric joining techniques known by those having skill in the art.

The sheets that form the fluidly coupled cells are gas impermeable. The material used to make the cells can be gas impermeable or can be coated or laminated to be gas impermeable. Moreover, the impermeability can be imparted before or after joining the sheets to form the cells. For example the cells may be created by ultrasonically welding a material that is gas impermeable. Alternatively a fabric can be sown or woven and then laminated to make the sheets gas impermeable. For example, sheets joined by bond lines can be formed from a one piece woven fabric that is then laminated to form a gas impermeable inflatable support structure. One piece woven technology suitable for making the inflatable pads of the invention are known in the art of making airbags.

In one embodiment the bond lines can be formed by repeating patterns of cells formed from two sheets that are welded together using an ultrasonic welding drum or a hot plate welding drum that is machined or controlled to impress the pattern into the sheets of fabric. Exemplary techniques to welding the first and seconds sheets of gas impermeable material together to form a chamber having a cell structure comprising a plurality cells that are in fluid communication

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include, but are not limited to, ultrasonic welding, laser welding, stamp heat welding, hot plate welding, gluing, taping, sewing, and other fabric joining techniques known by those having skill in the art.

To minimize pad fill volume and pad weight, the support structures in certain regions of the pad area can be configured to support a particular part of a person's body when lying thereon. Regions that may be included in pad 100 include head region 126, neck region 128, shoulder region 130, middle back region 132, hip region 134, upper leg region 136, knee region 138, lower leg region 140, and feet region 142. Pad 100 typically includes at least shoulder region 130, hip region 134, and middle back region 132.

The size and configuration of the support members in combination with the size and configuration of the non-supporting regions is selected to provide adequate support and insulation while reducing or minimizing pad fill volume and/or pad weight.

FIGS. 2 and 3 illustrate cross-sections of sleeping pad 100 across different regions of sleeping pad 100. As shown in FIGS. 2 and 3, sleeping pad 100 includes fluidly coupled cells 122, bond lines 120, and non-supporting regions 112. The plurality of cells 122 provide an upper surface 127 and a lower surface 129 of inflatable pad 100 with a vertical thickness 125. The upper surface 127 provides a surface that can contact and elevate the user (e.g., by contacting the user directly or supporting another structure such as a tent floor, second camping pad, or sleeping bag). The bottom surface 129 is the surface configured to rest on the ground or sleeping surface (e.g., bunk or tent floor). In one embodiment, surface 127 can be made from a thicker or more durable fabric than upper surface 127, which avoids ruptures caused by sharp objects (e.g., rocks and sticks) that may be on the ground.

In one embodiment, the location of non-supporting regions and/or the thickness of the pad in a particular region can be selected to minimize pad fill volume while providing good support to a person's body when lying thereon. For example, in one embodiment, a secondary region including the neck region 128, middle back region 132, upper leg region 136, and/or lower leg region 140 can have fewer support members and/or a lower cell volume per unit of pad area than one or more primary regions that include head region 126, shoulder region 130, hip region 134, and/or feet region 142. The head, shoulder, hip and feet region can include adjacent support members that span between sides 108 and 110 and provide a higher density of support members than other regions.

With reference again to FIGS. 1-3, the cross-section shown in FIG. 2 is through hip region 134 and the cross section shown in FIG. 3 is through upper leg region 136. As evident from FIGS. 1-3, the fill volume per unit pad area is much greater in the hip region 134 shown in FIG. 2 compared to the fill volume per unit pad area in the upper leg region 136 shown in FIG. 3. This difference is achieved by having support structures of a similar size in both regions and including non-inflating regions 112 in the secondary region (i.e., the upper leg region).

In order to form non-supporting regions, the inflatable pad 100 may include angled support members that define triangular and/or trapezoidal non-supporting regions in the secondary (i.e., less supportive) regions. In contrast, a majority of the bond lines in the primary region may be substantially parallel. For example, a majority of the bond lines of adjacent support members in the primary regions of pad 100 are substantially parallel. In alternative embodiments, par-

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allel bond lines may be horizontal, vertical, or non perpendicular to the periphery of the frame of the inflatable pad.

The vertical thickness is typically selected in combination with the design pressure to achieve a desired support. Generally greater design pressure allows for a smaller vertical thickness while still elevating a person off the ground. In one embodiment, the pad is configured to be filled with greater than 2 psi, greater than 3 psi, greater than 5 psi, or even greater than 10 psi. The pressure is preferably less than 30 psi, more preferably less than 15 psi, even more preferably less than 10 psi, and most preferably less than 5 psi. The present invention also includes ranges of the foregoing pressures. Pressures above 2 psi generally require a pump since human lungs cannot typically inflate a pad sized for a person to a pressure greater than 2 psi.

The average vertical thickness of the support members of the pad is typically correlated with the lateral spacing of the bond lines, wherein wider bond lines results in an increased vertical thickness and thus increased fill volume. In one embodiment, the vertical thickness of the support members may be in a range from about 2 cm to about 10 cm, preferably 2.5 cm to about 8 cm, or more preferably 3 cm to 6 cm.

The position and size of the non-supporting or non-inflating regions is selected to reduce pad volume while maintaining proper support. The size of non-supporting regions 112 can be at least about 2 cm in length and width, at least 5 cm in length and width, or even at least 10 cm in length and width. At least a portion of the non-supporting regions may cover at least 25 cm² of the pad area, at least 50 cm², or at least 100 cm² and more preferably 200 cm².

The non-supporting regions may be spaced apart at particular distances to avoid locations where a person lying on the pad will fall through and contact the ground. In one embodiment, the non-supporting regions between support members ranges from about 2.5 cm to about 40 cm. In another embodiment, the distance between adjacent internal support members ranges from about 5 cm to about 30 cm. In yet another embodiment, the distance between adjacent internal support members ranges from about 10 cm to about 20 cm.

The non-supporting regions reduce the fill volume per unit of pad area in the regions where thicker support is not necessary to provide separation from the ground, thereby reserving larger fill volumes for important regions. The larger fill volume per unit pad area in the head region 126, shoulder region 130, hip region 134, and/or feet region 142, provides better insulation and separation between the ground and portions of a person's body in places that require more insulation and/or support. Those skilled in the art will recognize that various different arrangements of non-supporting regions can be used to provide insulation and/or support in desired locations. FIGS. 4-6 illustrate alternative configurations of support members and non-supporting regions.

FIG. 4 illustrates a pad that includes non-supporting regions 212a-212c concentrated toward the sides 208 and 210 of inflatable pad 200. Inflatable pad 200 includes a head region 226, neck region 228, shoulder region 230, back region 232, hip region 234, upper leg region 236, knee region 238, lower leg region 240, and foot region 242. The support members 222 are formed from a plurality of bond lines form fluidly coupled cells. A majority of the bond lines and support members are substantially parallel to sides 208 and 210. By placing the non-supporting regions 212 on the lateral sides, the support members located centrally can extend from end 204 to lower leg region 240. Non-support-

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ing regions **212a-212c** may be triangular shaped and/or trapezoidal shaped to minimize torsion of the inflatable pad **200**.

FIG. **5** illustrates an alternative embodiment in which bond lines **320** are horizontal (i.e., perpendicular to sides **308** and **310** and parallel with ends **304** and **306**. Inflatable pad **300** includes a head region **326**, neck region **328**, shoulder region **330**, back region **332**, hip region **310**, upper leg region **336**, knee region **338**, lower leg region **340**, and feet region **342**. Non-supporting (e.g., non-inflatable) regions **312a-312d** are positioned toward lateral sides **308** and **310** and support members are positioned centrally from head region **326** to lower leg region **340**. The ends of horizontal support members do not extend all the way to sides **308** and **310**, which provides a channel on the inside of sides **308** and **310** where air can flow and fill or deflate horizontal support members **322**.

Those skilled in the art will recognize that other configurations can be used in which the shoulders, head, and hip regions are supported more than the middle of the back, and/or legs. In some embodiments the inflatable pad need not extend the full length of a person. FIG. **6** shows a shortened pad **400** that has a first end **404** that extends to a second end **406** with a head region **426**, neck region **428**, shoulder region **430**, back region **432**, and hip region **434**. In this embodiment, substantially all of the leg and feet region may be eliminated. In a preferred embodiment, pad **400** at least includes non-supporting regions (e.g., low fill volume/pad area) located in the middle back region **432** and a high fill volume/pad area located in shoulder region **430** and hip region **434**. The shortened inflatable pad **400** shown in FIG. **6** can be made highly compact and transportable but provide adequate support to elevate a person off the ground while camping.

Because inflatable pads shown in FIGS. **1-6** includes non-supporting regions and/or regions with low fill volume/pad area located in positions where heat loss and/or support is of less concern, the inflatable pads of the invention can have a low fill volume for a given total pad area (i.e. footprint) while still providing adequate insulation. As mentioned, the term "pad area" is the footprint of the pad when inflated to a usable pressure. In other words, the pad area is the area bounded by the ends and sides of the pad, including non-supporting regions (e.g. regions **112a-112m**), whether or not the non-supporting regions are cut out. The pad area can be in a range from about 800-5000 in², preferably 1000-3000 in², and more preferably 1200-2000 in². The pad area may have dimensions of about 150 cm to about 200 cm in length and 40 cm to 60 cm in width. The fill volume of the pad may be in a range from about 3-60 liters, preferably 4-35 liters, and more preferably 5-20 liters.

In one embodiment, the ratio of fill volume to pad area can be in a range from about 0.4-4.0 ml/cm², preferably 0.5-3.0 ml/cm², and more preferably 0.6-2.0 ml/cm². The inflatable sleeping pads of the invention can also be very lightweight, which is advantageous for hiking and other outdoor uses. In one embodiment, the sleeping pad weighs less than 750 g, preferably less than 500 g, and most preferably less than 250 g. In one embodiment, the ratio of the pad weight to pad area is less than 0.08 g/cm², preferably less than 0.06 g/cm², and most preferably less than 0.04 g/cm².

FIG. **7** shows a portion of the inflatable pad **100** in greater detail. In one embodiment, one or two valves are provided on an end of the inflatable pad such that the inflatable pad can be rolled up in a way that allows air to escape as the pad is un-inflated. In a preferred embodiment, the inside surface **147** at an end **104** of inflatable pad **100** does not have bond

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lines that join the outer periphery. By terminating the bond lines before the edge or inner surface **147** between valves **147**, air is allowed to travel between the two valves and can escape as the pad is rolled or folded. Moreover, by providing two valves, the pad **100** can be folded in half before rolling or folding lengthwise and air can still escape both sides of the pad. While the valves have been shown on end **104**, the valves **114** and **116** can also be positioned on an opposite end **106** of pad **100** (FIG. **1**). Providing a channel along the inside of the outer edge can also be beneficial on the sides of the pad. For example, as shown in FIG. **5**, horizontal support members can be terminated before reaching sides **308** and **310**. Bond lines that terminate in an interior of the pad area preferably include a rounded end (e.g., rounded end **145**), which avoids separation of the sheets.

The valves **114** and **116** may be used to provide both mouth inflation and pump inflation. The mouth inflation and pump inflation can be provided in a single valve or two separate valves. Two separate valves that allow both mouth inflation and pump inflation can also be used. Any valve mechanisms known in the art suitable for mouth inflation and pump inflation can be used. In a preferred embodiment, a pump valve includes a connector with one or more ridges that allows a pump to be snap connected to prevent its release as pressure in the fluidly coupled cells reaches pressures exceeding 2 psi. Where two separate valves are used, the valves are preferably spaced apart on opposite sides or opposite ends of the sleeping pad such that the sleeping pad can be folded in half when deflated and still provide an outlet for fluid escaping the fluidly coupled cells.

Surprisingly, the thickness and configuration of the bond lines **120** can substantially impact the torsional stability and shape of pad **100**. Torsion across pad **100** can be minimized wherein a majority and/or substantially all of the bond lines **120** forming the inflatable fluidly coupled cells **122** are substantially parallel. The number of parallel lines from one side to the other can also change the outer dimensions of the pad by pulling in the outer edges horizontal to the bond lines. Bond lines that are parallel tend to pull the edges in symmetrically, thereby minimizing torsion.

The width and shape of the bond lines have been found to influence how the fabric is pulled when inflated. In one embodiment a portion of the bond lines **120** can flare. Or in other words, the bond width can increase towards one end, which has been found to bunch the fabric lateral to the flared end. For example, a portion of the bond lines in FIG. **7** include flares **144a** of medium width and flares **144b** with greater flaring.

A second end **145** of a portion or all of the bond lines may have a rounded end. Since end **145** is a termination point of the bonding, the end may be rounded to add additional bonding strength and to distribute pull forces in a radial manner, which tends to minimize the chances of the first and second sheets pulling apart at this location. The other bond lines (not numbered) in FIG. **7** may include similar features of rounded and flared ends. In an alternative embodiment an inflatable pad may have a first portion of parallel bond lines having a different bond thickness than a second portion of the parallel bond lines. In a preferred embodiment, the different bond line thicknesses reduce torsion in the frame when inflated.

The minimum and/or average width of the bond lines can be in a range from 1 mm to 20 mm, preferably 2 mm to 15 mm, and more preferably 3 mm to 10 mm. The flare preferably occurs over a length of at least 5 mm and the increase in width along the flare can be at least 1 mm, preferably at least 2 mm and most preferably at least 5 mm.

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The rounded ends can have a diameter in a range between 10-30 mm preferably 12.5-25 mm, and most preferably 15-20 mm.

II. Methods of Using a Sleeping Pad

In another embodiment, a method for elevating an article above the ground is disclosed. In one aspect, the method may include (1) providing an inflatable support structure sized and configured for elevating the article above the ground, and (2) inflating the inflatable support structure to a pressure in a range from about 2 psi to about 20 psi so as to elevate the article above the ground. In one embodiment, the inflatable support structure includes at least first and second layers of a gas impermeable material joined together to form a plurality of fluidly coupled cells, wherein the plurality of fluidly coupled cells include a peripheral support frame and a plurality of internal support members disposed within the peripheral frame, and a valve mechanism fluidly coupled to the plurality of inflatable cells and configured for inflating and deflating the inflatable support structure.

In one embodiment, the inflatable pad may be inflated to a first pressure using mouth inflation and then inflated to a second pressure using a pump. The pump may be used to inflate the pad to a pressure in a range from 2 psi to 20 psi, preferably 3 psi to 10 psi in order to support the weight of a sleeper. The sleeping pad can be used by a person to sleep by lying on the pad and being elevated above the ground by the inflatable pad.

The pump used to inflate the pad to a second pressure above 2 psi may be a hand pump, a bicycle pump, or a compressed gas inflation device. Suitable examples of compressed gases that can be used to fill the inflatable frame structure may include, but are not limited to, air, argon, krypton, xenon, carbon dioxide, sulfur hexafluoride, and combinations thereof. For example, a user who inflates by mouth followed by "topping off" with a compressed gas inflation system that uses an 8 gram (21 ml at 3600 psi) canister of argon can get 4-5 "top offs" with 1 canister or one complete fill with one canister.

In one embodiment, the methods include inflating the frame, supporting a sleeping pad and/or sleeping pad with a person thereon or therein. In this embodiment, the pressure and thickness in the frame may be configured to support the person lying on the sleeping pad such that there is substantially no direct contact between a flat support surface and the sleeping pad. In one embodiment, the person can be an adult male with a height in a range from about 5 feet 6 inches to 6 feet 4 inches and weighing in a range from about 120 pounds to about 230 pounds. In an alternative embodiment, the frame can be configured for a person weighing between 80 and 160 pounds and a height of between 5 feet and 6 feet tall.

The present invention also include kits of an inflatable pad according to the invention and a pump that connects to a valve of the inflatable pad to pump to a pressure greater than 2 psi.

While the present invention has been illustrated with support members that are substantially parallel, those skilled in the art will recognize that other configurations of support members can be used, including substantially round members, and substantially spherical members.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended

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claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. An inflatable sleeping pad configured for supporting a person sleeping thereon, the inflatable sleeping pad comprising:

a frame comprising a first sheet of material joined to a second sheet of material at a plurality of bond lines to form a plurality of fluidly connected air inflatable support members, each air inflatable support member defined between at least two bond lines of the plurality of bond lines, wherein at least some of the air inflatable support members are configured to support a person lying on the inflatable sleeping pad;

a first valve coupled to the frame and in fluid communication with the air inflatable support members for inflation thereof;

wherein the frame includes a pattern of non-supporting regions defined by non-inflating regions, the plurality of bond lines, and/or cutouts of the first and second sheets;

wherein at least some of the bond lines comprise a rounded first end having a diameter, a flared second end having a width, and a transitioning portion therebetween, wherein the width of the flared second end is greater than the diameter of the rounded first end; and wherein the frame has a ratio of a fill volume/pad area in a range from about 0.4-4.0 ml/cm² where the fill volume consists of the volume of air contained within the air inflatable support members at a pressure of 2 psi.

2. The inflatable sleeping pad of claim 1, wherein each non-supporting region has a length and width of at least 2 cm.

3. The inflatable sleeping pad of claim 1, wherein at least a portion of the non-supporting regions are provided in the form of the bond lines between the first and second sheets, each bond line including the rounded first end, and the diameter of the rounded first end is at least 10 mm.

4. The inflatable sleeping pad of claim 1, wherein the frame is elongate in a longitudinal direction and the pattern of non-supporting regions form a plurality of horizontal rows.

5. The inflatable sleeping pad of claim 1, wherein an average maximum vertical thickness of the support members is in a range from 2.5 cm to 8 cm.

6. The inflatable sleeping pad of claim 5, wherein the average maximum vertical thickness of the support members is at least 3 cm.

7. The inflatable sleeping pad of claim 1, wherein one or both of the sheets of material are a polyurethane or a polyester.

8. The inflatable sleeping pad of claim 1, wherein at least a portion of the support members are elongate and oblique.

9. The inflatable sleeping pad of claim 1, wherein a weight of the frame is less than 750 g.

10. The inflatable sleeping pad of claim 1, wherein the frame has a weight to surface area ratio less than 0.08 g/cm².

11. The inflatable sleeping pad of claim 1, wherein: the first and second sheets are made from fabrics suitable for fabric welding;

at least a portion of the non-supporting regions are bond lines with a width and length of at least 2 cm;

the frame has a maximum width in a range from 40 cm to 60 cm and a maximum length in a range from 150 cm to 200 cm;

a weight of the frame is less than 750 g; and

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an average maximum vertical thickness of the support members is in a range from 2.5 cm to 8 cm.

12. An inflatable sleeping pad configured for supporting a person sleeping thereon, the inflatable pad comprising:

a frame comprising a first sheet of fabric material joined to a second sheet of fabric material to form a plurality of fluidly connected air inflatable support members, the frame having a maximum width of at least 40 cm and a maximum length of at least 150 cm, wherein a portion of the support members are configured to support a person lying thereon;

a first valve coupled to the frame and in fluid communication with the air inflatable support members for inflation thereof;

wherein the frame includes a repeating pattern of non supporting regions formed from fabric welds between the first and second sheets, the repeating pattern including rounded welds with a diameter of at least 10 mm; wherein a portion of the fabric welds comprise at least one of the rounded welds at a first end and a flared weld at a second end having a width, wherein the width of the flared weld is greater than the diameter of the at least one rounded weld, wherein the flared and rounded welds reduce torsion when the inflatable pad is inflated;

wherein an average maximum vertical thickness of the support members is in a range from 2.5 cm to 8 cm; wherein the frame has a weight to surface area ratio less than 0.08 g/cm²; and

wherein the frame has a ratio of a fill volume/pad area in a range from about 0.4-4.0 ml/cm² where the fill volume is defined as the volume of air contained within the frame at a pressure of 2 psi.

13. The inflatable sleeping pad of claim 12, wherein one or both of the sheets of material are a polyurethane or a polyester.

14. The inflatable sleeping pad of claim 12, wherein the frame has a maximum width in a range from 40 cm to 60 cm and a maximum length in a range from 150 cm to 200 cm.

15. The inflatable sleeping pad of claim 12 wherein a weight of the frame is less than 750 g.

16. An inflatable sleeping pad configured for supporting a person sleeping thereon, the inflatable pad comprising:

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a frame comprising a first sheet of fabric material joined to a second sheet of fabric material at a plurality of fabric welds to form a plurality of fluidly connected air inflatable support members, each air inflatable support member defined between at least two fabric welds of the plurality of fabric welds, the frame having a maximum width of at least 40 cm and a maximum length of at least 150 cm, wherein at least some of the air inflatable support members are configured to support a person lying on the inflatable pad;

a first valve coupled to the frame and in fluid communication with the air inflatable support members for inflation thereof;

wherein an average maximum vertical thickness of the support members is in a range from 2.5 cm to 8 cm and the frame includes fabric welds between the first and second sheets, wherein the fabric welds taper from a flared end having an individual width to a transitioning portion, the transitioning portion located between the flared end and a rounded end having a diameter, the flared end being at least 5 mm in length and the fabric welds increase in width at least 2 mm from the transitioning portion to the flared end, wherein the individual width of the flared end is greater than the diameter of the rounded end;

wherein a portion of the fabric welds comprise a flare toward one end of the fabric weld wherein the flare reduces torsion when inflated.

17. The inflatable sleeping pad of claim 16, wherein the fabric weld increases in width by at least 5 mm from the transitioning portion to the flared end.

18. The inflatable sleeping pad of claim 16, wherein the frame has a ratio of a fill volume/pad area in a range from about 0.4-4.0 ml/cm² where the fill volume consists of the volume of air contained within the air inflatable support members at a pressure of 2 psi.

19. The inflatable sleeping pad of claim 16, wherein one or both of the sheets of material are a polyurethane or a polyester.

* * * * *

EXHIBIT B

(12) **United States Patent**
Alder et al.

(10) **Patent No.:** **US 9,936,814 B2**
(45) **Date of Patent:** **Apr. 10, 2018**

(54) **INFLATABLE PAD AND METHODS FOR USING THE SAME**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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Related U.S. Application Data

(63) Continuation of application No. 14/860,451, filed on Sep. 21, 2015, now Pat. No. 9,756,955, which is a continuation of application No. 12/942,897, filed on Nov. 9, 2010, now abandoned.

(60) Provisional application No. 61/259,568, filed on Nov. 9, 2009, provisional application No. 61/370,405, filed on Aug. 3, 2010.

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A47C 27/08 (2006.01)

(52) **U.S. Cl.**
CPC **A47C 27/081** (2013.01); **A47C 27/087** (2013.01)

(58) **Field of Classification Search**

CPC A47C 27/081; A47C 27/10; A47C 27/18; A47C 27/08; A47C 27/128; A61G 7/05769; A61G 7/05776
See application file for complete search history.

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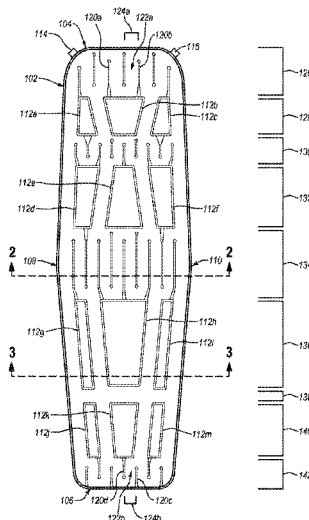
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(57) **ABSTRACT**

The inflatable pad includes an inflatable frame having a length and width that defines a pad area suitable for supporting a person lying thereon. A plurality of internal support members are configured to support the weight of a person lying thereon and elevate the person above the ground. The inflatable pad includes non-supporting regions that require less fill volume than regions that support primary support regions such as the hips and shoulder.

20 Claims, 6 Drawing Sheets



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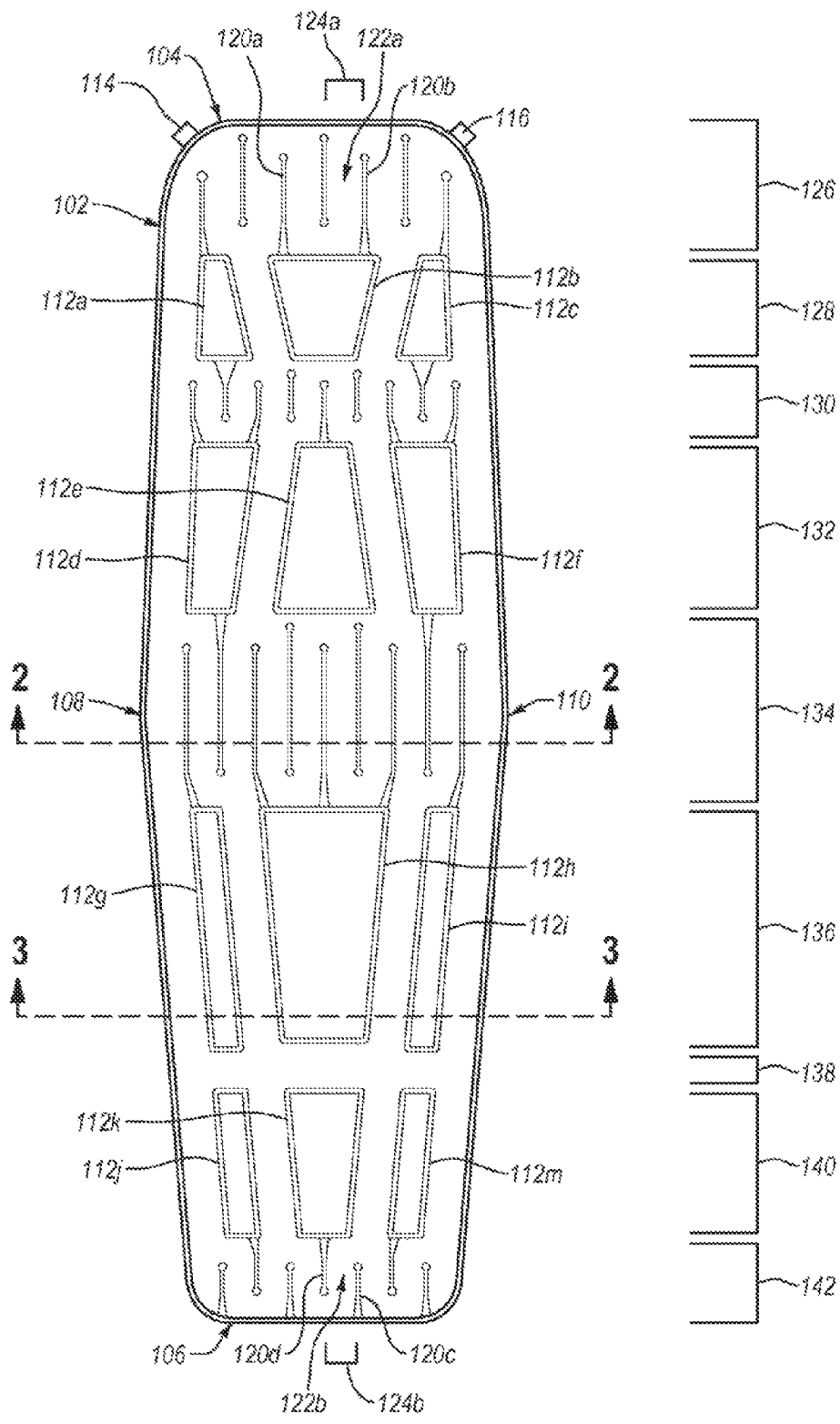
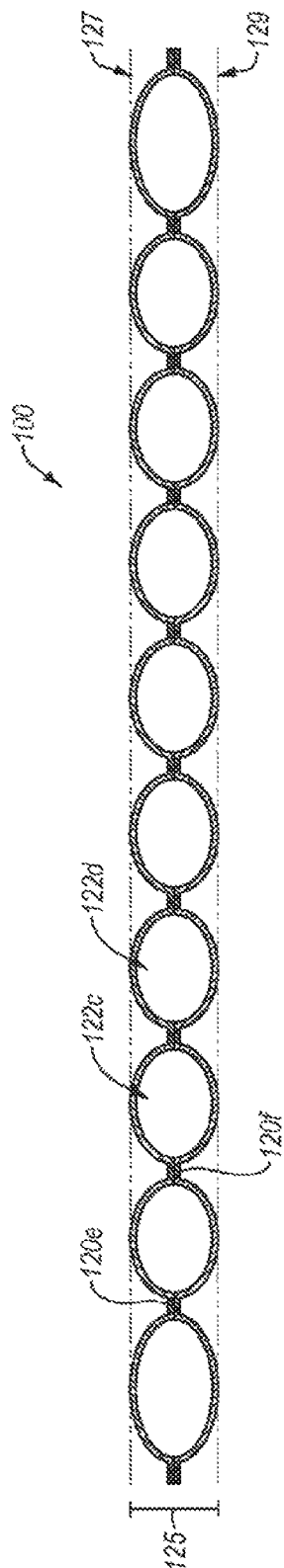
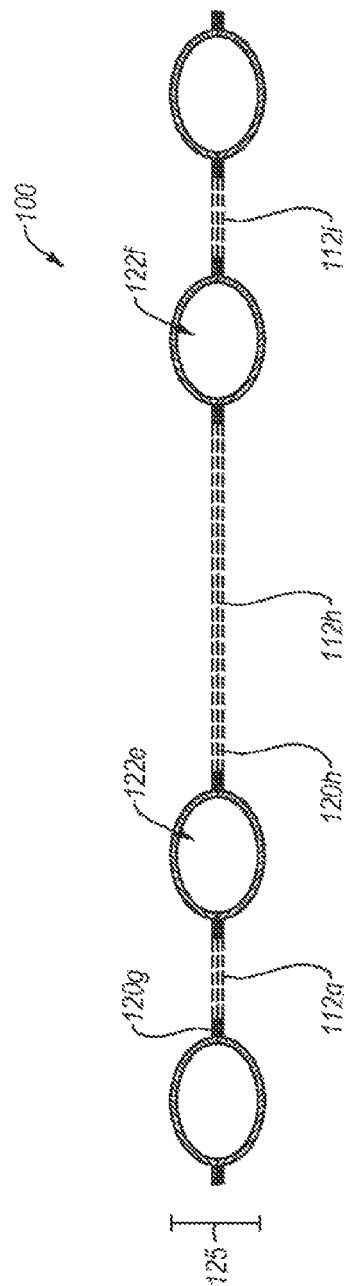
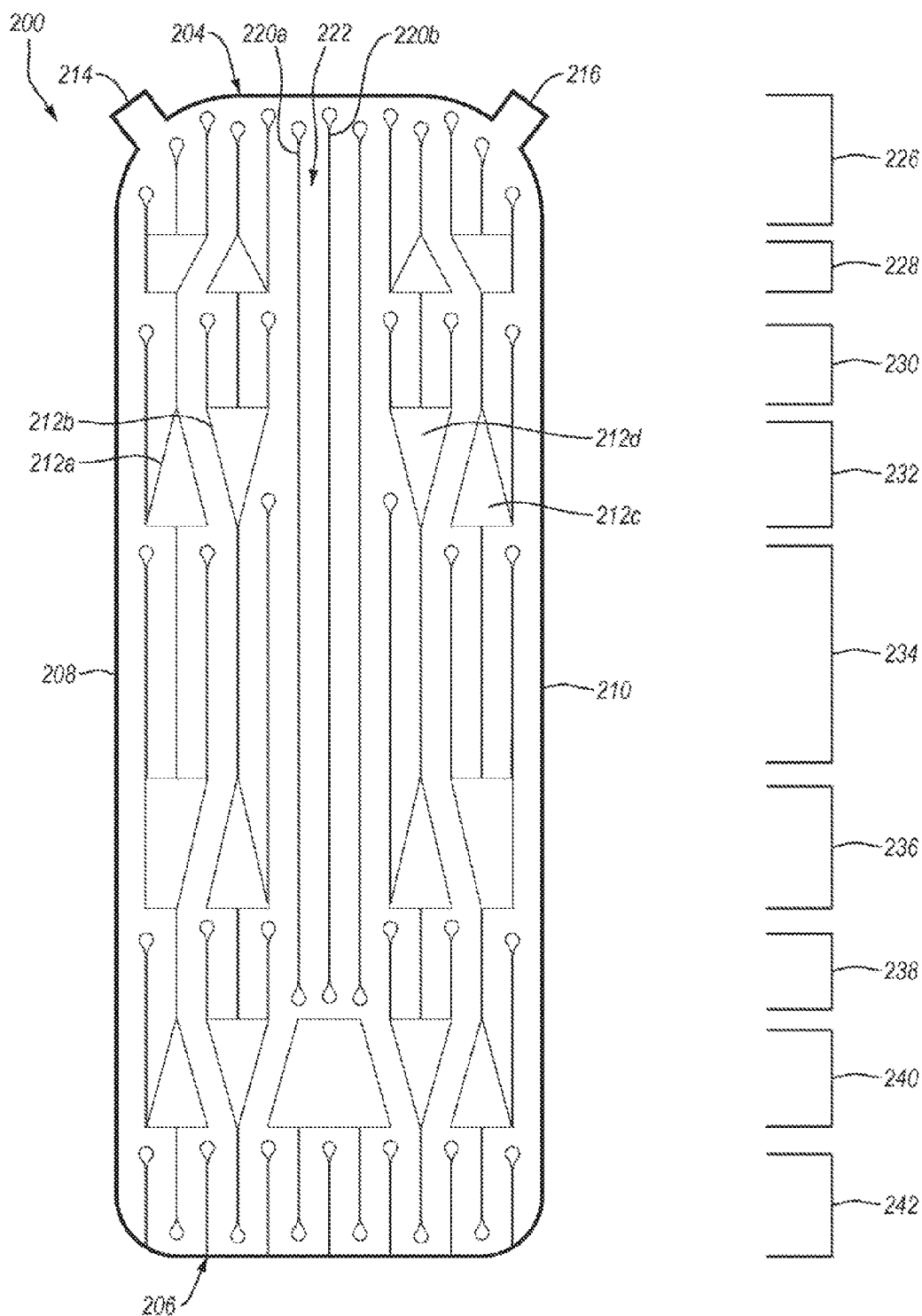


Fig. 1



254





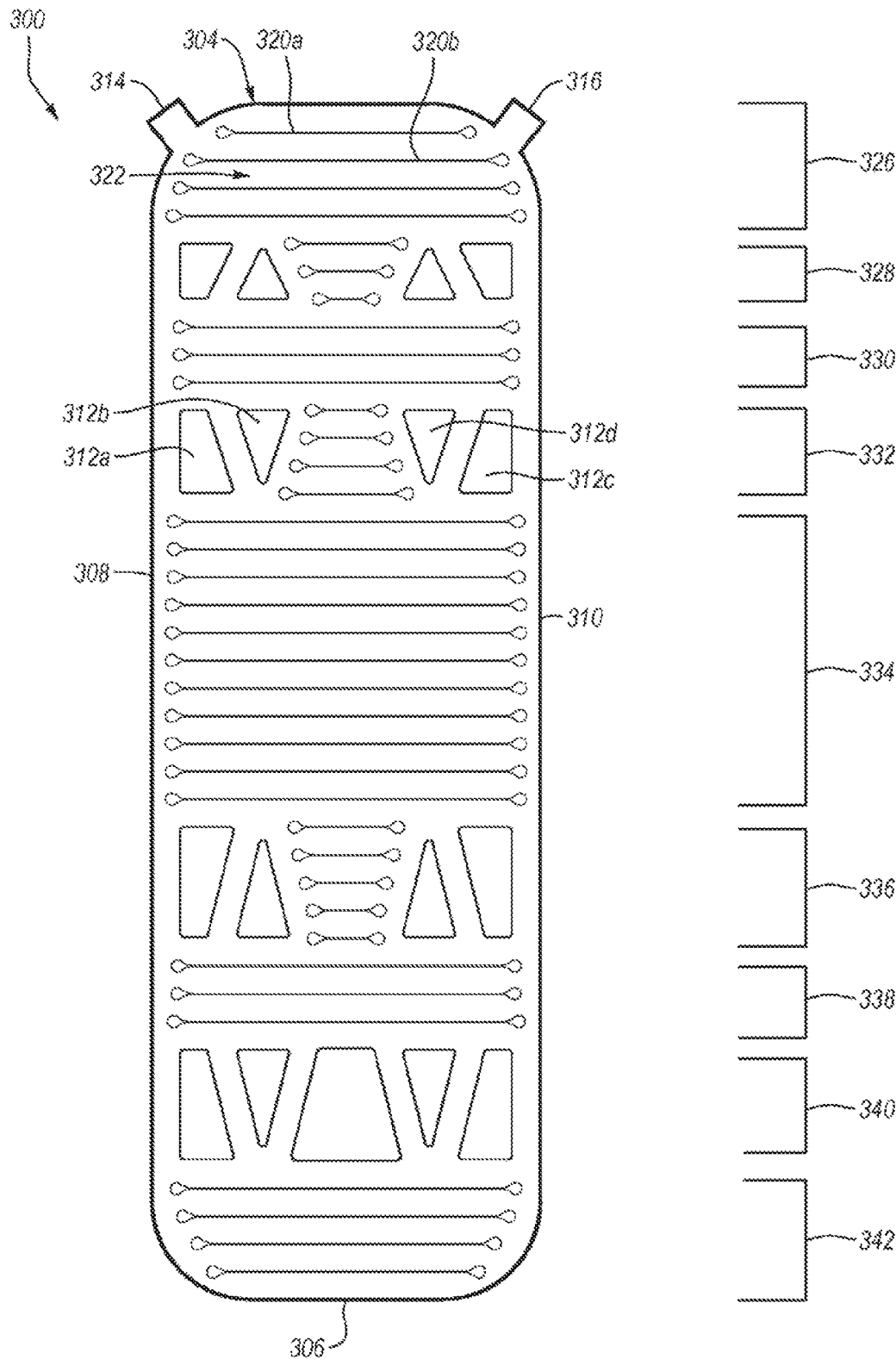


Fig. 5

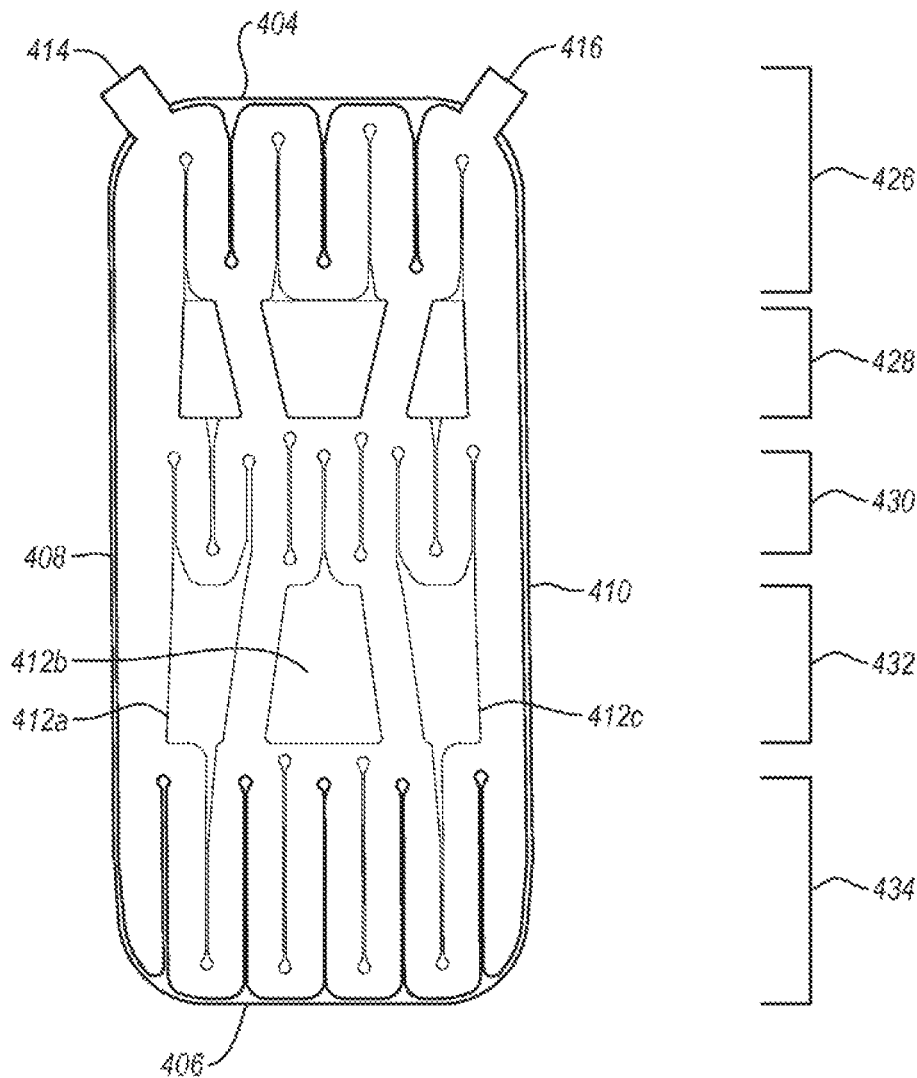


Fig. 6

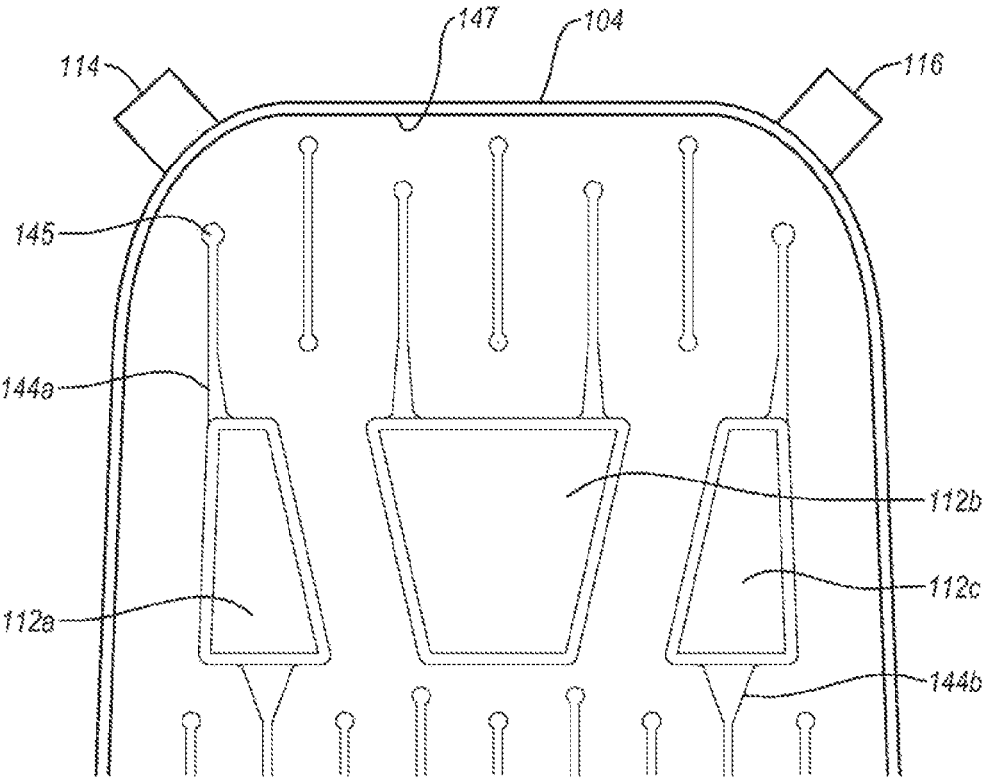


Fig. 7

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**INFLATABLE PAD AND METHODS FOR
USING THE SAME****CROSS REFERENCE TO RELATED
APPLICATIONS**

The present application is a continuation of U.S. patent application Ser. No. 14/860,451 filed on Nov. 9, 2015 and is entitled "INFLATABLE PAD AND METHODS FOR USING SAME" which is a continuation of U.S. patent application Ser. No. 12/942,897 filed on Nov. 9, 2010 and is entitled "INFLATABLE PAD AND METHODS FOR USING SAME" which claims the benefit of U.S. Provisional Patent Application Ser. No. 61/259,568 filed Nov. 9, 2009, entitled "INFLATABLE FRAME STRUCTURE," and U.S. Provisional Patent Application Ser. No. 61/370,405 filed Aug. 3, 2010 entitled "INFLATABLE FRAME STRUCTURE," which are both hereby incorporated herein by reference in their entirety.

BACKGROUND OF THE INVENTION**The Field of the Invention**

The present invention relates to inflatable support structures.

The Relevant Technology

When camping, a lightweight pad or mattress is typically used under a sleeping bag. Camping pads provide support, padding, and some insulation for the user. Camping pads fall into two general categories: inflatable and not inflatable.

Those that are not inflatable are essentially closed-cell foam strips of a predetermined size. Non-supporting pads tend to be heavier than inflatable types. Non-supporting pads may be used in any camping situation.

There are two basic types of inflatable camping pads, both of which rely on a quantity of air for inflation during use and which deflate for portage.

A first, and generally older type of camping pad, is essentially an inflatable air mattress. A fill valve is opened and air is forced in under positive pressure by mouth, typically, to inflate the camping pad a desired amount.

A second, and generally newer type of camping pad, is a variation of the prior type that also includes an open-cell expandable type of foam filler therein. When a fill valve for such a type of camping pad is opened, the compressed foam (from the deflated state) begins to expand and naturally inflates the mattress. The camping pads that include the foam are generally regarded as being of superior design because they self-inflate (at least to a limited extent) and therefore are easier to use. Also, they tend to be warmer and therefore, more comfortable.

While these and perhaps other types of camping pads or mattresses have been used for a long time, they have certain disadvantages when used for camping. For example, virtually all campers are aware of the rarity of level, smooth ground. In addition, the ground tends to act as a heat sink that can rob the sleeper of valuable body heat, which can cause campers to be cold while sleeping on the ground.

BRIEF SUMMARY OF THE INVENTION

The present invention relates to inflatable pads and methods for using the inflatable pads to support a person lying thereon (e.g., lying supine, prone, or on one's side on the ground while camping). The inflatable pad includes an inflatable frame having a length and width that defines a pad area suitable for supporting a person lying thereon. A

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plurality of internal support members are configured to support the weight of a person lying thereon and elevate the person above the ground. The inflatable pad includes non-supporting regions that have less fill volume than regions that support primary support regions such as the hips and shoulder. Fill volume (i.e., the air required to fill the inflatable support members) is reduced by properly selecting the thickness and/or spacing of the support members in is selected regions of the pad. The reduced fill volume allows the pad to be filled in a more reasonable period of time and with less effort than inflatable pads that have uniform support. Moreover, in some embodiment, the inflatable pad may be inflated to pressures greater than 2 psi (i.e., greater than pressures obtained using one's lungs), which provides greater comfort and allows proper support with a much thinner and lighter pad compared to inflatable pads that have uniform cushioning across the length of the pad.

In one embodiment the inflatable pad includes a frame comprising a first sheet of material joined to a second sheet of material by a plurality of elongate bond lines, the elongate bond lines forming a plurality of fluidly coupled cells that define a plurality of air-inflatable support members, a portion of the bond lines define non-supporting regions within the pad area. A first valve is coupled to the inflatable frame and is in fluid communication with the fluidly coupled cells.

In a second embodiment, the inflatable pad includes primary support regions that have more volume per unit of pad area as compared to secondary support members. In this embodiment, the inflatable pad includes an inflatable frame having a length and width that defines a pad area suitable for supporting a person lying thereon, the frame including a plurality of fluidly coupled cells that define a plurality of air inflatable support members. The frame has a plurality of primary supported regions and a plurality of secondary supported regions. The primary supported regions have a higher pad volume per unit of pad area than the secondary supported regions. The primary support regions are located in a hip region, shoulder region, and/or head region and the secondary supported regions are located in a neck, middle back, upper leg, and/or lower leg region. The inflatable pad also includes a first valve coupled to the inflatable frame and in fluid communication with the fluidly coupled cells.

The present invention also relates to inflatable pad that have minimal torsion when inflated. The inflatable pads include bond lines that form the plurality fluidly coupled cells. The bond lines may include fabric welds in which a first portion of the bond lines have a different bond thickness than a second portion of the bond lines. The different thicknesses of the bond lines are positioned on the inflatable pad so as to reduce torsion in the frame when inflated.

The present invention is also directed to methods for inflating and supporting a person on the inflatable pad. In one embodiment, the methods can include inflating the pad to a first pressure by mouth and then inflating to a second higher pressure using a pump. This embodiment takes advantage of the large volumes, low pressure capabilities of a person's lungs, while providing a reasonably sized pump that can create the pressures that provide comfort and proper insulation in a compact inflatable pad.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

To further clarify the above and other advantages and features of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended

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drawings. It is appreciated that these drawings depict only illustrated embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

FIG. 1 illustrate an inflatable pad according to one embodiment of the invention;

FIG. 2 is a cross section of the inflatable pad of FIG. 1 showing a primary region with high pad volume per unit pad area;

FIG. 3 is a cross section of a the inflatable pad of FIG. 2 showing a secondary region with a low pad volume per unit pad area;

FIG. 4 illustrates an alternative embodiment of a an inflatable pad according to the present invention including substantially parallel vertical bond lines;

FIG. 5 illustrates an alternative embodiment of an inflatable pad according to the present invention including substantially parallel horizontal bond lines;

FIG. 6 illustrates yet another alternative embodiment of an inflatable pad according to the present invention; and

FIG. 7 is a partial top view of the inflatable pad of FIG. 1.

DETAILED DESCRIPTION

I. Introduction

The present invention relates to inflatable pads such as, but not limited to, sleeping pads used for camping. The placement of the support structures is designed in such a way as to minimize weight, and volume, but achieve proper support. In addition, because the inflatable pad uses air pressure to support the camper's weight, the inflatable frame structure can be made from non-rigid materials, which allows the frame to be collapsed and packed into a small volume when the frame is not inflated.

The inflatable frame structure described herein may be used to lift a person and/or camping pad or another article off of the ground. By lifting a camper's sleeping bag, camping pad, tent, or other article off the cold ground, the air trapped between the ground and the pad, tent, or person provides substantial insulation relative to the bulk and weight of the sleeping pad. Additionally, because the sleeping pad elevates the camping pad above the ground, the frame structure may provide additional protection from rocks, roots, and other objects that might otherwise cause discomfort to the sleeper.

For purposes of this invention, the term fill volume means the volume of air within the fluidly coupled support members when filled to a pressure of 2 psi.

For purposes of this invention, the term pad area means the footprint of the pad when inflated to a usable pressure (i.e., the pressure in the pad is sufficient to elevate a person off the ground). The pad area includes non-supported or non-inflated regions within the periphery of the inflated pad.

II. Sleeping Pads

FIG. 1 illustrates an example inflatable sleeping pad 100 configured for supporting a person sleeping thereon. The sleeping pad includes an inflatable frame 102 having a length and width that defines a pad area suitable for supporting a person lying thereon. The frame has a length that extends between first end 104 (i.e., head end) and second end 106 (foot end) and a width that extends between side 108 and side 110. Sleeping pad 100 also includes a first valve 114 that is mouth inflatable and a second valve 116 that connects

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to a pump. Valves 114 and 116 are in fluid communication with frame 102 and are configured to allow frame 102 to be inflated and deflated.

Sleeping pad 100 is formed from a first sheet of material joined to a second sheet of material by a plurality of elongate bond lines 120. For clarity, only a portion of the bond lines and fluidly coupled cells illustrated in FIGS. 1-6 are identified with numbers. In FIG. 1, bond lines 120a and 120b join first and second sheets of fabric together to form a fluid cell 122a that when inflated provides a support member having a width 124a. Similarly, bond lines 120d and 120c form fluid cell 122b that, when inflated, provide a support member having a width 124b.

In the embodiment shown in FIG. 1, a portion of the bond lines form a plurality of fluidly coupled cells that provide inflatable support members and at least a portion of the bond lines form non-supporting regions within the pad area. For example, cut outs 112a, 112b, 112c, 112d, 112e, 112f, 112g, 112h, 112i, 112j, 112k, and 112m may be non-inflatable regions that are sealed off by bond lines from valves 114 and 116 and cells 124a and 124b. In FIG. 1, the non-supporting regions 112 may have the fabric cut out to minimize weight. However, in alternative embodiments non-inflated regions 112 may include one or more layers of fabric. Moreover, non-supporting regions may be inflatable so long as the vertical thickness of the regions renders the region, non-supporting. Non-supporting regions typically have a vertical thickness less than half that of the supporting members, preferably less than one third, and most preferably less than one fourth that of the vertical thickness of the adjacent supporting members.

In one embodiment, the sheets of material joined to form the fluidly coupled cells may be a gas impermeable laminate material, such as, but not limited to, polyethylene, polypropylene, polyurethane, urethane, silicone rubber, latex rubber, polytetrafluoroethylene (PTFE), expanded PTFE, butyl rubber, and/or Mylar.

Exemplary techniques for forming bond lines with material that is joined together to form a plurality of fluidly coupled cells include, but are not limited to, ultrasonic welding, laser welding, stamp heat welding, hot plate welding, gluing, taping, sewing, one piece woven, and other fabric joining techniques known by those having skill in the art.

The sheets that form the fluidly coupled cells are gas impermeable. The material used to make the cells can be gas impermeable or can be coated or laminated to be gas impermeable. Moreover, the impermeability can be imparted before or after joining the sheets to form the cells. For example the cells may be created by ultrasonically welding a material that is gas impermeable. Alternatively a fabric can be sown or woven and then laminated to make the sheets gas impermeable. For example, sheets joined by bond lines can be formed from a one piece woven fabric that is then laminated to form a gas impermeable inflatable support structure. One piece woven technology suitable for making the inflatable pads of the invention are known in the art of making airbags.

In one embodiment the bond lines can be formed by repeating patterns of cells formed from two sheets that are welded together using an ultrasonic welding drum or a hot plate welding drum that is machined or controlled to impress the pattern into the sheets of fabric. Exemplary techniques to welding the first and seconds sheets of gas impermeable material together to form a chamber having a cell structure comprising a plurality cells that are in fluid communication include, but are not limited to, ultrasonic welding, laser

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welding, stamp heat welding, hot plate welding, gluing, taping, sewing, and other fabric joining techniques known by those having skill in the art.

To minimize pad fill volume and pad weight, the support structures in certain regions of the pad area can be configured to support a particular part of a person's body when lying thereon. Regions that may be included in pad 100 include head region 126, neck region 128, shoulder region 130, middle back region 132, hip region 134, upper leg region 136, knee region 138, lower leg region 140, and feet region 142. Pad 100 typically includes at least shoulder region 130, hip region 134, and middle back region 132.

The size and configuration of the support members in combination with the size and configuration of the non-supporting regions is selected to provide adequate support and insulation while reducing or minimizing pad fill volume and/or pad weight.

FIGS. 2 and 3 illustrate cross-sections of sleeping pad 100 across different regions of sleeping pad 100. As shown in FIGS. 2 and 3, sleeping pad 100 includes fluidly coupled cells 122, bond lines 120, and non-supporting regions 112. The plurality of cells 122 provide an upper surface 127 and a lower surface 129 of inflatable pad 100 with a vertical thickness 125. The upper surface 127 provides a surface that can contact and elevate the user (e.g., by contacting the user directly or supporting another structure such as a tent floor, second camping pad, or sleeping bag). The bottom surface 129 is the surface configured to rest on the ground or sleeping surface (e.g., bunk or tent floor). In one embodiment, surface 127 can be made from a thicker or more durable fabric than upper surface 127, which avoids ruptures caused by sharp objects (e.g., rocks and sticks) that may be on the ground.

In one embodiment, the location of non-supporting regions and/or the thickness of the pad in a particular region can be selected to minimize pad fill volume while providing good support to a person's body when lying thereon. For example, in one embodiment, a secondary region including the neck region 128, middle back region 132, upper leg region 136, and/or lower leg region 140 can have fewer support members and/or a lower cell volume per unit of pad area than one or more primary regions that include head region 126, shoulder region 130, hip region 134, and/or feet region 142. The head, shoulder, hip and feet region can include adjacent support members that span between sides 108 and 110 and provide a higher density of support members than other regions.

With reference again to FIGS. 1-3, the cross-section shown in FIG. 2 is through hip region 134 and the cross section shown in FIG. 3 is through upper leg region 136. As evident from FIGS. 1-3, the fill volume per unit pad area is much greater in the hip region 134 shown in FIG. 2 compared to the fill volume per unit pad area in the upper leg region 136 shown in FIG. 3. This difference is achieved by having support structures of a similar size in both regions and including non-inflating regions 112 in the secondary region (i.e., the upper leg region).

In order to form non-supporting regions, the inflatable pad 100 may include angled support members that define triangular and/or trapezoidal non-supporting regions in the secondary (i.e., less supportive) regions. In contrast, a majority of the bond lines in the primary region may be substantially parallel. For example, a majority of the bond lines of adjacent support members in the primary regions of pad 100 are substantially parallel. In alternative embodiments, parallel bond lines may be horizontal, vertical, or non-perpendicular to the periphery of the frame of the inflatable pad.

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The vertical thickness is typically selected in combination with the design pressure to achieve a desired support. Generally greater design pressure allows for a smaller vertical thickness while still elevating a person off the ground. In one embodiment, the pad is configured to be filled with greater than 2 psi, greater than 3 psi, greater than 5 psi, or even greater than 10 psi. The pressure is preferably less than 30 psi, more preferably less than 15 psi, even more preferably less than 10 psi, and most preferably less than 5 psi. The present invention also includes ranges of the foregoing pressures. Pressures above 2 psi generally require a pump since human lungs cannot typically inflate a pad sized for a person to a pressure greater than 2 psi.

The average vertical thickness of the support members of the pad is typically correlated with the lateral spacing of the bond lines, wherein wider bond lines results in an increased vertical thickness and thus increased fill volume. In one embodiment, the vertical thickness of the support members may be in a range from about 2 cm to about 10 cm, preferably 2.5 cm to about 8 cm, or more preferably 3 cm to 6 cm.

The position and size of the non-supporting or non-inflating regions is selected to reduce pad volume while maintaining proper support. The size of non-supporting regions 112 can be at least about 2 cm in length and width, at least 5 cm in length and width, or even at least 10 cm in length and width. At least a portion of the non-supporting regions may cover at least 25 cm² of the pad area, at least 50 cm², or at least 100 cm² and more preferably 200 cm².

The non-supporting regions may be spaced apart at particular distances to avoid locations where a person lying on the pad will fall through and contact the ground. In one embodiment, the non-supporting regions between support members range from about 2.5 cm to about 40 cm. In another embodiment, the distance between adjacent internal support members ranges from about 5 cm to about 30 cm. In yet another embodiment, the distance between adjacent internal support members ranges from about 10 cm to about 20 cm.

The non-supporting regions reduce the fill volume per unit of pad area in the regions where thicker support is not necessary to provide separation from the ground, thereby reserving larger fill volumes for important regions. The larger fill volume per unit pad area in the head region 126, shoulder region 130, hip region 134, and/or feet region 142, provides better insulation and separation between the ground and portions of a person's body in places that require more insulation and/or support. Those skilled in the art will recognize that various different arrangements of non-supporting regions can be used to provide insulation and/or support in desired locations. FIGS. 4-6 illustrate alternative configurations of support members and non-supporting regions.

FIG. 4 illustrates a pad that includes non-supporting regions 212a-212c concentrated toward the sides 208 and 210 of inflatable pad 200. Inflatable pad 200 includes a head region 226, neck region 228, shoulder region 230, back region 232, hip region 234, upper leg region 236, knee region 238, lower leg region 240, and foot region 242. The support members 222 are formed from a plurality of bond lines form fluidly coupled cells. A majority of the bond lines and support members are substantially parallel to sides 208 and 210. By placing the non-supporting regions 212 on the lateral sides, the support members located centrally can extend from end 204 to lower leg region 240. Non-support-

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ing regions **212a-212c** may be triangular shaped and/or trapezoidal shaped to minimize torsion of the inflatable pad **200**.

FIG. **5** illustrates an alternative embodiment in which bond lines **320** are horizontal (i.e., perpendicular to sides **308** and **310** and parallel with ends **304** and **306**). Inflatable pad **300** includes a head region **326**, neck region **328**, shoulder region **330**, back region **332**, hip region **310**, upper leg region **336**, knee region **338**, lower leg region **340**, and feet region **342**. Non-supporting (e.g., non-inflatable) regions **312a-312d** are positioned toward lateral sides **308** and **310** and support members are positioned centrally from head region **326** to lower leg region **340**. The ends of horizontal support members do not extend all the way to sides **308** and **310**, which provides a channel on the inside of sides **308** and **310** where air can flow and fill or deflate horizontal support members **322**.

Those skilled in the art will recognize that other configurations can be used in which the shoulders, head, and hip regions are supported more than the middle of the back, and/or legs. In some embodiments the inflatable pad need not extend the full length of a person. FIG. **6** shows a shortened pad **400** that has a first end **404** that extends to a second end **406** with a head region **426**, neck region **428**, shoulder region **430**, back region **432**, and hip region **434**. In this embodiment, substantially all of the leg and feet region may be eliminated. In a preferred embodiment, pad **400** at least includes non-supporting regions (e.g., low fill volume/pad area) located in the middle back region **432** and a high fill volume/pad area located in shoulder region **430** and hip region **434**. The shortened inflatable pad **400** shown in FIG. **6** can be made highly compact and transportable but provide adequate support to elevate a person off the ground while camping.

Because inflatable pads shown in FIGS. **1-6** includes non-supporting regions and/or regions with low fill volume/pad area located in positions where heat loss and/or support is of less concern, the inflatable pads of the invention can have a low fill volume for a given total pad area (i.e. footprint) while still providing adequate insulation. As mentioned, the term "pad area" is the footprint of the pad when inflated to a usable pressure. In other words, the pad area is the area bounded by the ends and sides of the pad, including non-supporting regions (e.g. regions **112a-112m**), whether or not the non-supporting regions are cut out. The pad area can be in a range from about 800-5000 in², preferably 1000-3000 in², and more preferably 1200-2000 in². The pad area may have dimensions of about 150 cm to about 200 cm in length and 40 cm to 60 cm in width. The fill volume of the pad may be in a range from about 3-60 liters, preferably 4-35 liters, and more preferably 5-20 liters.

In one embodiment, the ratio of fill volume to pad area can be in a range from about 0.4-4.0 ml/cm², preferably 0.5-3.0 ml/cm², and more preferably 0.6-2.0 ml/cm². The inflatable sleeping pads of the invention can also be very lightweight, which is advantageous for hiking and other outdoor uses. In one embodiment, the sleeping pad weighs less than 750 g, preferably less than 500 g, and most preferably less than 250 g. In one embodiment, the ratio of the pad weight to pad area is less than 0.08 g/cm², preferably less than 0.06 g/cm², and most preferably less than 0.04 g/cm².

FIG. **7** shows a portion of the inflatable pad **100** in greater detail. In one embodiment, one or two valves are provided on an end of the inflatable pad such that the inflatable pad can be rolled up in a way that allows air to escape as the pad is uninflated. In a preferred embodiment, the inside surface **147** at an end **104** of inflatable pad **100** does not have bond

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lines that join the outer periphery. By terminating the bond lines before the edge or inner surface **147** between valves **147**, air is allowed to travel between the two valves and can escape as the pad is rolled or folded. Moreover, by providing two valves, the pad **100** can be folded in half before rolling or folding lengthwise and air can still escape both sides of the pad. While the valves have been shown on end **104**, the valves **114** and **116** can also be positioned on an opposite end **106** of pad **100** (FIG. **1**). Providing a channel along the inside of the outer edge can also be beneficial on the sides of the pad. For example, as shown in FIG. **5**, horizontal support members can be terminated before reaching sides **308** and **310**. Bond lines that terminate in an interior of the pad area preferably include a rounded end (e.g., rounded end **145**), which avoids separation of the sheets.

The valves **114** and **116** may be used to provide both mouth inflation and pump inflation. The mouth inflation and pump inflation can be provided in a single valve or two separate valves. Two separate valves that allow both mouth inflation and pump inflation can also be used. Any valve mechanisms known in the art suitable for mouth inflation and pump inflation can be used. In a preferred embodiment, a pump valve includes a connector with one or more ridges that allow a pump to be snap connected to prevent its release as pressure in the fluidly coupled cells reaches pressures exceeding 2 psi. Where two separate valves are used, the valves are preferably spaced apart on opposite sides or opposite ends of the sleeping pad such that the sleeping pad can be folded in half when deflated and still provide an outlet for fluid escaping the fluidly coupled cells.

Surprisingly, the thickness and configuration of the bond lines **120** can substantially impact the torsional stability and shape of pad **100**. Torsion across pad **100** can be minimized wherein a majority and/or substantially all of the bond lines **120** forming the inflatable fluidly coupled cells **122** are substantially parallel. The number of parallel lines from one side to the other can also change the outer dimensions of the pad by pulling in the outer edges horizontal to the bond lines. Bond lines that are parallel tend to pull the edges in symmetrically, thereby minimizing torsion.

The width and shape of the bond lines have been found to influence how the fabric is pulled when inflated. In one embodiment a portion of the bond lines **120** can flare. Or in other words, the bond width can increase towards one end, which has been found to bunch the fabric lateral to the flared end. For example, a portion of the bond lines in FIG. **7** include flares **144a** of medium width and flares **144b** with greater flaring.

A second end **145** of a portion or all of the bond lines may have a rounded end. Since end **145** is a termination point of the bonding, the end may be rounded to add additional bonding strength and to distribute pull forces in a radial manner, which tends to minimize the chances of the first and second sheets pulling apart at this location. The other bond lines (not numbered) in FIG. **7** may include similar features of rounded and flared ends. In an alternative embodiment an inflatable pad may have a first portion of parallel bond lines having a different bond thickness than a second portion of the parallel bond lines. In a preferred embodiment, the different bond line thicknesses reduce torsion in the frame when inflated.

The minimum and/or average width of the bond lines can be in a range from 1 mm to 20 mm, preferably 2 mm to 15 mm, and more preferably 3 mm to 10 mm. The flare preferably occurs over a length of at least 5 mm and the increase in width along the flare can be at least 1 mm, preferably at least 2 mm and most preferably at least 5 mm.

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The rounded ends can have a diameter in a range between 10-30 mm preferably 12.5-25 mm, and most preferably 15-20 mm.

III. Methods of Using a Sleeping Pad

In another embodiment, a method for elevating an article above the ground is disclosed. In one aspect, the method may include (1) providing an inflatable support structure sized and configured for elevating the article above the ground, and (2) inflating the inflatable support structure to a pressure in a range from about 2 psi to about 20 psi so as to elevate the article above the ground. In one embodiment, the inflatable support structure includes at least first and second layers of a gas impermeable material joined together to form a plurality of fluidly coupled cells, wherein the plurality of fluidly coupled cells include a peripheral support frame and a plurality of internal support members disposed within the peripheral frame, and a valve mechanism fluidly coupled to the plurality of inflatable cells and configured for inflating and deflating the inflatable support structure.

In one embodiment, the inflatable pad may be inflated to a first pressure using mouth inflation and then inflated to a second pressure using a pump. The pump may be used to inflate the pad to a pressure in a range from 2 psi to 20 psi, preferably 3 psi to 10 psi in order to support the weight of a sleeper. The sleeping pad can then be used by a person to sleep by lying on the pad and being elevated above the ground by the inflatable pad.

The pump used to inflate the pad to a second pressure above 2 psi may be a hand pump, a bicycle pump, or a compressed gas inflation device. Suitable examples of compressed gases that can be used to fill the inflatable frame structure may include, but are not limited to, air, argon, krypton, xenon, carbon dioxide, sulfur hexafluoride, and combinations thereof. For example, a user who inflates by mouth followed by "topping off" with a compressed gas inflation system that uses an 8 gram (21 ml at 3600 psi) canister of argon can get 4-5 "top offs" with 1 canister or one complete fill with one canister.

In one embodiment, the methods include inflating the frame, supporting a sleeping pad and/or sleeping pad with a person thereon or therein. In this embodiment, the pressure and thickness in the frame may be configured to support the person lying on the sleeping pad such that there is substantially no direct contact between a flat support surface and the sleeping pad. In one embodiment, the person can be an adult male with a height in a range from about 5 feet 6 inches to 6 feet 4 inches and weighing in a range from about 120 pounds to about 230 pounds. In an alternative embodiment, the frame can be configured for a person weighing between 80 and 160 pounds and a height of between 5 feet and 6 feet tall.

The present invention also includes kits of an inflatable pad according to the invention and a pump that connects to a valve of the inflatable pad to pump to a pressure greater than 2 psi.

While the present invention has been illustrated with support members that are substantially parallel, those skilled in the art will recognize that other configurations of support members can be used, including substantially round members, and substantially spherical members.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes

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which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed:

1. An inflatable pad comprising:
 - a frame comprising: a first sheet of material and a second sheet of material joined at a plurality of bond lines, wherein the bond lines are elongated, wherein at least one end of each of the bond lines increases in width;
 - a plurality of fluidly coupled cells defined between at least two bond lines of the plurality of bond lines, wherein the plurality of fluidly coupled cells comprise a first width and a second width; and
 - a first valve coupled to the frame and in fluid communication with the plurality of fluidly coupled cells.
2. The inflatable pad of claim 1, wherein the first width and the second width are the same.
3. The inflatable pad of claim 1, wherein the first width and the second width are the different.
4. The inflatable pad of claim 1, wherein the elongated bond lines are longer than they are wider.
5. The inflatable pad of claim 1, further comprising a primary region and a secondary region, wherein the primary region comprises a greater number of fluidly coupled cells than the secondary region.
6. The inflatable pad of claim 5, wherein the primary region is configured to support at least a head of a user.
7. The inflatable pad of claim 1, wherein an average vertical thickness of the plurality of fluidly coupled cells is in a range from 2.5 cm to 10 cm.
8. An inflatable pad comprising:
 - a pad area;
 - a first valve coupled to a frame and in fluid communication with the plurality of fluidly coupled cells;
 - the frame comprising a first sheet of fabric material and a second sheet of fabric material joined at a plurality of bond lines with at least one bond line around the entire periphery of the first sheet of fabric material and the second sheet of fabric material, wherein at least one end of each of the plurality of bond lines increases in width; wherein the plurality of bond lines comprise non-supporting regions wherein the non-supporting regions cover at least 25 cm² of the pad area.
9. The inflatable pad of claim 8, wherein a portion of the plurality of bond lines are non-perpendicular to the periphery of the frame.
10. The inflatable pad of claim 8, wherein the bond lines are elongated and the bond lines are longer than they are wider.
11. The inflatable pad of claim 8, wherein the plurality of fluidly coupled cells comprise a first width and a second width wherein the first width is the same as the second width.
12. The inflatable pad of claim 8, wherein the plurality of fluidly coupled cells comprise a first width and a second width wherein the first width is different from the second width.
13. The inflatable pad of claim 8, wherein the frame has a maximum width in a range from 40 cm to 60 cm and a maximum length in a range from 150 cm to 200 cm with a fill volume/pad area in a range from about 0.4-4.0 ml/cm².
14. The inflatable pad of claim 8, wherein an average vertical thickness of the plurality of fluidly coupled cells is in a range from 2.5 cm to 10 cm.
15. An inflatable sleeping pad comprising:
 - a frame configured to hold air and configured to support a person sleeping thereon, the frame comprising:

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a first sheet of material and a second sheet of material
 joined at their periphery by an outer bond line;
 a plurality of bond lines within the periphery of the
 outer bond line wherein at least one end of each of
 the plurality of bond lines within the periphery 5
 increases in width;
 a plurality of fluidly coupled cells defined between at
 least two bond lines of the plurality of bond lines;
 and
 a first valve coupled to the frame and in fluid commu- 10
 nication with the plurality of fluidly coupled cells.

16. The inflatable sleeping pad of claim **15**, wherein a
 portion of the plurality of bond lines are in communication
 with the outer bond line.

17. The inflatable sleeping pad of claim **15**, wherein a 15
 portion of the plurality of bond lines are separate from and
 not in communication with the outer bond line.

18. The inflatable pad of claim **15**, wherein the plurality
 of bond lines are elongated and flare toward a second end of
 the plurality of bond lines. 20

19. The inflatable pad of claim **15**, wherein the plurality
 of fluidly coupled cells comprise a first width and a second
 width wherein the first width is the same as the second
 width.

20. The inflatable pad of claim **15**, wherein the plurality 25
 of fluidly coupled cells comprise a first width and a second
 width wherein the first width is different from the second
 width.

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